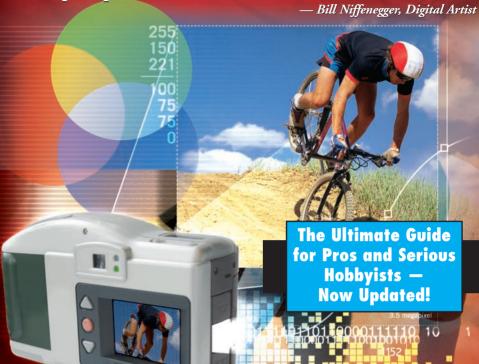**100%**

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Ron Rockwell

Digital Photography Bible

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Digital Photography Bible

2nd Edition

Ken Milburn
Ron Rockwell
Mark Chambers

About the Authors

Ken Milburn started taking pictures the year he entered high school and was working professionally as a wedding photographer by the time he graduated. He has been involved with photography both as a hobby and professionally ever since and has worked in advertising, travel, and fashion photography.

Ken has been working with computers since 1981 and has written hundreds of articles, columns, and reviews for such publications as *Publish, DV Magazine*, *Computer Graphics World, PC World, Macworld,* and *Windows Magazine.* He has also published ten other computer books, including the first edition of *Digital Photography Bible, Master VISUALLY Photoshop 6.0, CliffsNotes Taking and Sharing Digital Photographs,* and *Photoshop 5.5 Professional Results.*

Ken also maintains a practice as a commercial photo-illustrator and has become internationally known for his photo-paintings, which have been featured twice in *Design Graphics Magazine,* in the all-time best-selling poster for the 1988 Sausalito Arts Festival, and in the 1999 American President Lines calendar.

Ron Rockwell began his career as a technical illustrator in the days when eraser crumbs and ink-stained fingers were a sign of the trade. With a degree in commercial art, he became an art director at a Silicon Valley print shop. After that, he launched a long freelance career peppered with a year here and there as art director for both large and small advertising agencies in California, Pennsylvania, New Jersey, and Hawaii. During that time, he continued servicing freelance clients he had acquired in the early seventies.

Besides being a graphic designer and technical illustrator, Ron is a successful professional photographer with a fully equipped studio consisting of traditional medium format equipment and state-of-the-art digital equipment. You can see some of his work at `www.nidus-corp.com`. In 2001, Ron wrote *FreeHand 10 f/x & Design*, and he is hard at work on a book for the next version of Macromedia FreeHand. Ron is an active member on FreeHand Web forums and a member of Team Macromedia.

Mark L. Chambers has been an author, computer consultant, BBS sysop, programmer, and hardware technician for over 15 years. His previous books include *Building A PC For Dummies, Scanners For Dummies, CD & DVD Recording For Dummies, Microsoft Office v. X for Mac Power Users Guide,* and others. Mark is currently a full-time author and tech editor. He recently served as an HP Web Clinic instructor in the use of CD-RW drives.

Credits

To my son, Lane. Thanks for all the help.

Preface

This edition of *Digital Photography Bible* is packed with tips and tricks that help you become a better photographer. These tips and tricks are in each chapter, so they pertain to every aspect of digital photography, from what to look for in a new camera to how to solve persistent digital photography challenges by using Photoshop (and quite a lot of other software).

The digital photography industry has expanded exponentially every year since its inception, but last year was the biggie, with nearly a 600 percent explosion in growth. It was also the first year that, excluding disposable cameras, the sales of new film cameras was exceeded by the sales of digital cameras.

More importantly, because this book is intended for digital photographers who are serious about their use of this technology, the state of the art in digital photographic equipment has risen markedly. When the first edition of this book was published, the majority of digital cameras in the thousand-dollar price range sported between two and three megapixels of resolution. Today, semi-pro (often called *prosumer*) level cameras are moving into the six megapixel range, which is roughly equivalent in resolution to medium speed (ISO 200) moderately priced 35mm color film.

This book is for anyone who wants in-depth information about digital photography. *Digital Photography Bible,* 2nd Edition, is written especially for the person who wants to make the most of those digital cameras that are in a price range appropriate for serious hobbyists, business professionals, and professional photographers who are not quite ready to spend more than $3,000 on a digital camera.

What's in This Book

Digital Photography Bible, 2nd Edition, covers digital photography basics, tips and tricks, and loads of digital shooting and processing details. This book is broken down into seven parts.

Part I: The Role of Digital Photography

This part of *Digital Photography Bible* begins with an in-depth analysis of the role of digital photography as it relates to traditional photography, including who should use it, why, and when it is more appropriate to use than film. The first chapter touts the advantages of digital photography, counters with the advantages of film-based picture-taking, and then wraps things up by talking about how to get the best of both worlds by digitizing photographs shot on film.

Chapter 2 enables you to get the most from your digital camera — either the one you own or the one you hope to get. I explain what characteristics to look for, what the various shooting mode options are, how and when to take advantage of these modes, how to overcome parallax distortion, and how to judge the quality of optics in a potential camera purchase. I also discuss why certain sensor characteristics are sought after, how to determine which cameras have the best ergonomic design, and describe the various options in digital film memory cards, batteries, and connections for transferring images from camera to computer.

Chapter 3 is a basic manual of photographic techniques that every serious photographer should employ. It covers exposure, lighting, focus, motion capture, composition, how to capture the critical moment, and how to deal with inclement weather while on location.

Part II: The Shoot and the Equipment

Chapter 4 covers situations that arise on location. I cover many types of photography employed on location shoots such as event, candid, sports/action, travel, portrait, nature, macro, and architectural photography. If your interests lie in other areas, it's a good bet that they have a lot in common with one or more of these basic fields.

The subject of Chapter 5 is working in the studio: how to change backgrounds quickly, the most basic setups for shooting people, how to make a glamour or business portrait. Finally, I describe the basic setups for shooting flat artwork and still lifes.

Chapter 6 covers useful photo accessories including add-on lenses and filters, devices made to keep your camera steady, external flashes, and digital card readers.

Chapter 7 is all about how to equip your computer to get the most out of digital or digitized photographs. It also happens to be a good guide for equipping a computer for most any type of full-color, bit-mapped graphics work.

Part III: Before You Edit an Image

Part III is all about planning ahead so that you waste little time when you do get around to image editing. It's all about efficiently digitizing images, transferring images to the computer, cataloging and managing images, and choosing an image-editing program.

Chapter 8 covers converting analog to digital and concentrates mostly on choosing and using the right scanner for the right purpose.

Chapter 9 is a primer on the software and methods for cataloging, naming, and otherwise managing images so that you can quickly find the one you need when the time comes.

Chapter 10 discusses the considerations for choosing an image-editing program.

Part IV: Image-Editing Software

Part IV is devoted to the subject of using image-editing software to solve everyday professional problems.

Chapters 11 and 12 cover problems that can be solved with affordable mid-level image editors such as Photoshop Elements or Paint Shop Pro.

Chapter 13 covers more esoteric problems that can only be solved with the highest level of image-editing programs.

Chapter 14 introduces you to the basic techniques used for converting digital (digitized) photographs into illustrations that look like traditional paintings.

Part V: The Versatility of Digital Photography

Part V is all about new uses and forms for digital photography. The first of these, covered in Chapter 15, takes you through the steps and software needed to help you get your pictures onto the Internet. You learn to quickly and easily create your own portfolio site as well as how to prepare images that gives you the best compromise between performance and quality for use on any Web site.

Chapter 16 introduces you to a variety of software that produces special results, such as panoramas, super-high resolution images from a matrix of stitched photos, photo mosaics (each pixel in the image is a photograph), movies taken with still cameras, stereoscopic images taken with ordinary digital cameras, aerial photographs taken from kites, balloons, and model airplanes, and digital infrared photography.

Part VI: Producing the Best Output

Appropriately enough, the last group of chapters in *Digital Photography Bible* is all about what you do with your images when you've gotten them to the point where you're really proud to show them to the world.

Chapter 17 presents the criteria for choosing and using a desktop (or on-premises) printer.

Chapter 18 is a thorough discussion of how to make and use device profiles that guarantee predictable output to a variety of devices — particularly commercial printing presses.

Chapter 19 wraps up the book with a discussion of special purpose output options such as wide-format printing for fine art and commercial exhibition, printing without a computer, and printing via Internet services.

Part VII: Appendixes

Appendix A is an index of equivalent commands in the most popular image-editing programs. The step-by-step instructions I provide enable you to perform the same capabilities for the image-editing software you own. Appendix B covers resources for buying and evaluating all sorts of digital photography hardware and software.

Appendix B outlines the contents of the CD-ROM that accompanies the book. This appendix also details the minimum system requirements needed to use the CD-ROM.

The bonus material on the CD-ROM includes a chart comparing the most widely advertised digital cameras in the $500 to $2,500 price range. I concentrate on the cameras that offer high enough resolution and a wide enough range of controls to produce professionally usable photos.

Color Insert

The color insert in this book is meant to be more than just decorative. Each of the images is shown in full color that has been exquisitely reproduced. You see exactly the results produced by a specific procedure.

Who This Book Is For

You've probably guessed from its girth that this is not a beginner's guide or meant for those who have only a casual interest in digital photography. You probably fall into one of two categories:

✦ Serious photographers transitioning to digital photography or those already using digital photography and wanting more information

✦ People in business having serious and professional reasons to produce professional quality photographs but who must or would rather do it themselves than hire a professional photographer

Although you can certainly sit down and read it from cover to cover, it really has no beginning, middle, and end. It's a reference book — a sort of digital photography encyclopedia.

Hopefully, you find the writing style conversational and friendly. If you're new to digital photography, you'll find it reasonably easy to understand. At the same time, I expect you have in mind some serious applications for digital photography and need in-depth information.

How to Use This Book

This entire book can be found on the book's CD-ROM. This means you can read it in book form while you're sitting in bed or eating in a restaurant. On the other hand, you can keep it in your computer and use it for a quick reference whenever you like. The PDF file on the CD is searchable, so you can quickly find every reference to a topic quickly and without having to interrupt what you're doing.

This is a reference book — it's designed to be bought, used to find what you need when you need it, and then put on the shelf until you need it again.

Conventions Used in This Book

Words that are technical jargon and require a definition are italicized followed by a brief explanation.

Everything in this book, with the exception of products that are platform specific, is meant to be equally applicable to both Macs and PCs — computers that run some version of the Windows operating system. I always tell you how to perform keystrokes for a particular operation. The Mac keystroke shortcut is abbreviated first, followed by a slash (/) and then the Windows keystroke. I put the Mac command first because, historically, Mac Photoshop users came first and comprise the largest percentage of professional users of image-editing software. The equivalents between the two computers are as follows:

- ✦ Cmd/Ctrl
- ✦ Opt/Alt
- ✦ Backspace/Delete
- ✦ Control/Right Click

Notice that the Macintosh Control key is spelled out in full, whereas the PC control key is always abbreviated as Ctrl. I refer to keys with the same name and purpose for both operating systems (such as the Space bar) without the Mac/PC equivalents.

When you need to press several keys simultaneously or in sequence, those keys are named in that sequence and separated by a plus (+) sign.

Following the conventions I use in this book, the instructions to issue a command follow this format: Choose Image ⇨ Adjust ⇨ Levels (Cmd/Ctrl + L). The Levels dialog box appears. You then make specific choices in the dialog box.

Make This a Better Book: Talk to the Author

I may not be able to answer all the e-mail I get, but I certainly read all the messages and your voice will have an influence on future editions. Please don't let my lack of response to an e-mail discourage you from letting me know what you think — especially if you have constructive suggestions for improving this book.

Immediately following the completion of this book, my Web site (`www.kenmilburn.com`) was completely redesigned. One of the new features is a gallery of photos with "how I did it" tips attached. There are also lots of updates, news, and reviews of breaking developments in the field of digital photography. You can find my e-mail address through the Web site.

Acknowledgments

The editorial team at Wiley Publishing: Melody Layne, Kala Schrager, Rebekah Mancilla, and many others.

My agent, Margot Maley Hutchinson at Waterside Productions, who usually manages to keep me sane and on track and is able to apply brilliance, patience, and understanding when things just get overwhelming. Thanks for being a good friend and the best agent on the planet.

My friend (and often, co-author) Gene Hirsh who not only contributed to this project by writing the chapter on photopainting and two of the appendixes, but is just one of those few brilliant people who knows how to jump into any situation in a pinch and then perform miracles.

Fellow authors and steady, sturdy, and brilliant friends Janine Warner and Robert Cowart, both outstanding authors whose advice and support are always valued more than I can say.

Also Ron Rockwell, Mark Chambers, and Gregory MacNicol who contributed greatly to this project by writing several of the chapters in this edition.

All the manufacturers of digital photography products who went out of their way to supply products for testing, photographs, and help and advice. I especially want to emphasize the support given to this effort by Karen Thomas and Chris Sluka at Olympus and Lisa Baxt at Nikon. There has also been on-the-spot help, support, and permission to use images of products from numerous other companies: Adobe, ArcSoft, Corel, Deneba Software, JASC software, Microsoft, Ulead Systems, Monaco, Sony, Océ Display Graphics Systems, Hewlett-Packard, Epson, Xerox, to name a few.

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The Role of Digital Photography

Part I puts the role of digital photography into proper perspective for you. First, I discuss the role of digital photography in today's world and when it may be preferable to film photography. I also cover how to get the most out of the experience of using a digital camera, and I highlight the things that a digital camera can do that a film camera can't do — or that you wouldn't bother to try with a film camera. Finally, this part includes a conversational discussion of the most basic guidelines for making successful digital photographs.

Using Digital Versus Traditional Photography

✦ ✦ ✦ ✦

In This Chapter

The magic of digital photography

The characteristics of digital images

The advantages of digital photography

The advantages of analog photography

Hybrid digital photography

✦ ✦ ✦ ✦

I f *digital (filmless)* photography isn't the best thing since sliced bread, it's certainly the best thing for instant gratification since the invention of the Polaroid camera. If you take your photographs with a digital camera, you can see the results much faster than the time required to process an "instant" Polaroid. In the couple of seconds that it takes to see the results of your shot on a Polaroid print, if you don't like what you see from a digital camera, you just erase it. Erasing these images ensures that embarrassing shots have been removed from the proof sheet by the time you show it to the client (or anyone whose opinion you value).

Some folks may tell you that digital photography hasn't quite arrived and that conventional photography can do a better job. However, digital photography can result in a superior product that can be produced more quickly and cheaply over the long term, even though the initial investment can be considerably higher. This is why you would have difficulty finding a publication of any kind today in which the photographs have not been taken with a digital camera or at least, been digitized. More often than not, these photos have been digitally manipulated before publication. If you're talking about news, sports, or in-studio commercial photography, the odds are very high that they were photographed with a digital camera.

For many people, digital photography has also replaced film for personal use. Even fairly low-resolution digital cameras can produce album-size prints and digital cameras make it nearly instantaneous to e-mail or share pictures over the Web. Instant turnaround and quick communications are also good reasons why a good many professionals such as legal researchers and real estate agents use digital cameras.

Now, it's true that we have a ways to go before digital cameras can produce the image quality that we're used to receiving from conventional cameras at an equipment cost comparable to similarly-featured film cameras. But it's a far, far shorter lead than it was a couple of years ago when the first edition of this book was written. Highly portable and very easy-to-use digital cameras are now available that can produce results that meet or exceed the quality of all but the best quality 35mm film emulsions shot with the highest quality optics and processed in a professional lab.

Having stated these caveats, however, let me jump back to the subject of digital cameras. Even the inexpensive digital cameras have a definite place in the professional's camera bag or the businessperson's briefcase, because they're easier to keep at the ready and can produce pictures in the moment. Digital cameras are also magical tools for artists and serious hobbyists. The image quality of the best of today's thousand-dollar digital cameras is good enough to let you make 11 x 14-inch prints that — given a good, affordable, state-of-the-art desktop color printer — can fool most people into thinking that they're looking at a well-made *Type C* color photographic print (Type C is the name Kodak gives to its most popular paper for making color prints from color negatives). Additionally, the information and gratification that you get from being able to instantly see your photographs will make you a better photographer in much less time. Why? Because you can instantly judge what you did wrong and take the needed steps to correct it. Before long, you'll simply stop taking pictures in which a telephone pole appears to be growing out of the subject's head — and you'll know how to compensate for unusual lighting conditions. Even if you can't control your shooting position or the subject's position, you'll have the post-shooting option of easily removing the telephone pole or (more often than not) fixing the exposure.

The Advantages of Digital Photography

Digital imagery is to traditional photography what the Wright brothers' first aircraft was to the railroad industry. Photography that uses film and processing will always be around because it has a look, among other advantages, that is unique. For the most part, however, digital photography has characteristics that will ultimately make it the most widely-used means of taking photographs. Moreover, digital photography

is taking over more quickly than most would have imagined a scant year or so ago. During the Christmas season of 2001, digital cameras were the second most popular electronic gift after DVD (Digital Video Disc) players! The reasons for this surge in the popularity of digital cameras can be attributed to numerous factors:

✦ Fewer factors to discourage you from taking a photograph

✦ Instant gratification

✦ Instant turnaround

✦ Easy to create an image for use on a Web page

✦ No film necessary

✦ No darkroom or chemicals necessary

✦ Lower ongoing costs

✦ Easy proofing and presentation of images

✦ No generational degradation when unaltered copies are made

✦ Increased capabilities when compared to film cameras:

- Capture panoramas

- Combine several photos into one higher-resolution image

- Make short Web or demo videos

- Do automatic recording of multiple frames to capture rapid action sequences

Fewer barriers to taking a photograph

Given possession of a digital camera, most of us are much more likely to take a digital photo than an analog photo. This preference is based on some key characteristics of the digital photography medium:

✦ **Accessible:** A digital camera can be carried in a purse or shirt pocket. Even 5 megapixel resolution and 3:1 zoom lenses can be made to fit within a tiny profile. (For example, the Nikon D5000 is only about 2 inches thick, as shown in Figure 1-1.) So, it's easy to fall into the habit of having a camera with you at all times. This means you'll be able to document everything from prospects you meet at a party to accidents, thefts, and news events.

Figure 1-1: Even some semi-pro, high-resolution digital cameras will fit into a jacket pocket.

✦ **Forgiving:** No one ever needs to see your mistakes because you can erase them instantly (or later). Most digital cameras (and certainly any that I'd recommend) come equipped with an LCD monitor, like the one shown in Figure 1-2, that lets you instantly see your most recent shots. If time and circumstances permit, you can also instantly review all the images in a session. You can also erase any images that you don't like at that time. Finally, when you download the images to your computer, you have another chance to erase your images.

✦ **Cost-effective:** A discarded digital photo costs absolutely nothing. No precious film or processing was expended. The data space that it utilized in the camera's or computer's memory can be reused upon erasure. At most, all that the images consumed was a fraction of the rechargeable camera battery's power.

Instant gratification

In far less time than it takes a Polaroid shot to develop, you can see and show your digital image. I'm surprised the phrase "shoot and show" hasn't caught on yet as a slogan for some consumer-level digicam. The word *digicam* has become the buzz name for digital still cameras — particularly those aimed at consumers.
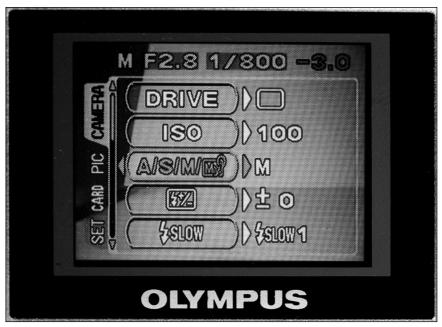
Figure 1-2: This is the LCD screen of Olympus 3120, showing one of the camera's settings menus. Many digital cameras use their LCD screens for this purpose, as well as for previewing and reviewing in-camera images.

Selfish gratification isn't the only reason you'll want to be able to instantly see your images. If you're shooting images that require the approval of a client or the input of a colleague, you can satisfy that need by using a digital camera. You can get instant client approval and avoid the cost and disappointment of being asked to reshoot.

Instant delivery

The speed with which you can deliver a digital image to a client is limited only by the speed of your computer and its access to your client. For example, you can deliver the results of an entire news or sports shoot within minutes. Even a 40MB advertising image can be transferred in far less time than would be necessary for a physical photograph to travel via express delivery — especially if that delivery had to cross national borders.

Facilitates using images on the Web

Any image that you see on a Web page is digital. The resolution of Web images is generally lower than that of even the least expensive digital still camera. When viewed on the Web, full-color images larger than 640 x 480 take more time to load than necessary and will extend beyond the limits of the browser window. Virtually any digital still or video camera will shoot 640 x 480 images. (A few inexpensive palm cams that have a maximum image size of 320 x 240 pixels are now available. These images are pretty tiny, but they are still big enough for the Web.) This means that you can use any digicam or camcorder to shoot the item that you want to place on your Web page, and post it to that Web page within moments.

Cross-Reference   Chapter 16 tells you more about using video cameras for capturing digital images. Chapter 15 shows cool techniques for tweaking Web-destined images for peak performance.

No film to buy or waste

An electronic image sensor formulates digital images and the numerical data is then stored in one of several re-recordable memory devices. These devices are often referred to as "digital film," but they are no more film than is your computer's RAM, hard drive, or floppy disk. In fact, the only permanent cost of storing a digital image is likely to be a fraction of the space on a write-once CD-ROM that you record on your own computer.

Cross-Reference   You can find a thorough discussion of various types of devices used for storing digital images and how each fits into the overall plan for equipping your digital darkroom in Chapter 7.

No darkroom or chemicals needed

Many photographers bitterly regret that the pressures of time and money make it impractical for them to do their own darkroom work, because it means giving up control over the result that will be given to the client or seen by the public. Furthermore, many traditional photographers will tell you that digitally processed images are "not really photographic" or "not really art." These are people who wish that this were true because they know that traditional darkroom is onerous enough to be a barrier to competition. Besides, they don't realize how blatantly they are displaying their ignorance. The truth is, you have far more power and flexibility in your ability to interpret a photograph digitally than in a wet darkroom. True, the digital photographer can stretch the truth in more ways that are much harder to detect, but anyone who tells you that the film camera never lies is a bald-faced liar.

Lower long-term costs

Although digital cameras are still several times the price of their analog counterparts, the fact that film and processing costs are eliminated ultimately evens the overall cost. Remember, as stated previously, that you will use the digital camera more than you would have used its analog counterpart. Of course, the truth of this statement depends on the extent of your use of the camera, which depends on what you use the camera for:

- ✦ **Casual shooters** are people who use cameras to photograph their family vacations.

- ✦ **Prosumers** are serious hobbyists or businesspeople who produce professional-quality photographs. Prosumers may get paid for some of their photographs, but photography isn't their sole means of income.

- ✦ **Professional photographers'** cost of film is higher because they usually buy more expensive grades of film and have it processed by a custom lab or hired assistant. The figure given in Table 1-1 is actually a bit conservative.

The relationship between how you use your digital camera and the costs you will incur are outlined in Table 1-1.

Table 1-1
The Long-Term Cost of Film, Processing, and Prints

	Rolls per week	*Cost per roll*	*Cost per month*	*Cost per year*
Casual Shooter	2.5	$11	$27.50	$330
Prosumer*	10	$11	$440	$5,200
Pro Photographer	100	$15*	$1,500	$18,000

Costs are also lower over time because of the "instant client approval and turnaround" factor and because shipping charges are seldom involved when transmitting these images. Kinda makes a new $5,000+ Nikon D1-x seem downright affordable, doesn't it?

Easy proofing and presentation of images

All of your pictures can be proofed electronically and instantly. You and your client (if present at the shoot) can even view results immediately after the shutter is pressed.

Both Windows XP and Mac OS X have been greatly enhanced in their ability to visually identify and present photos. In Windows XP, for example, you can view image folders as filmstrips, slide shows, thumbnails, or (when you need to save some room) as icons. Figure 1-3 shows a slide show created in Windows XP.
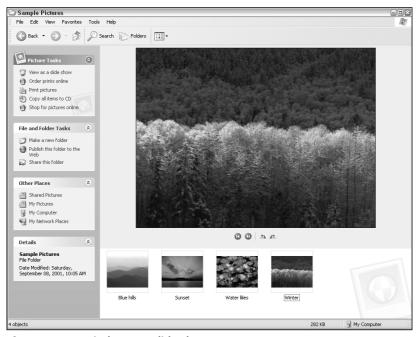
Figure 1-3: A Windows XP slide show

If your computer's operating system is a system that precedes Windows XP or Mac OS X or doesn't show your picture files as pictures, several software packages are available that can automatically prepare proof-sheet-sized thumbnails of all the images inside a folder (sometimes called a *subdirectory*) — and even print them out as proof sheets. You can then add comments, rotate thumbnails, and either show the results as a slide show onscreen or print proof sheets on a color printer. Figure 1-4 shows just such an electronic proof sheet.

Another tool that's useful for instant sharing of your images is a direct-to-print color printer. You don't even need a camera or computer to print to some of these machines. Direct-to-print printers generally produce a type of print that looks and feels almost exactly like a Polaroid or a 1-Hour jumbo print. Some of the latest printers of this type will even let you insert the memory card from your camera and then ask how many images you want to print per page — so you can make either proof sheets or any size print up to letter size.
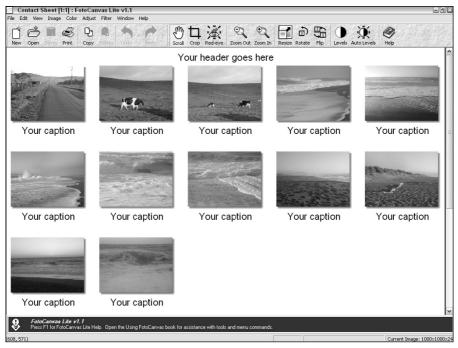
Figure 1-4: An electronic proof sheet created in ACDsee 4.0

Continually improving image quality

It is now possible to get truly photographic quality 8 x 10-inch prints from digital cameras that currently sell for well under $500 — so long as they advertise "2 megapixels" or higher resolution. Newer cameras that boast "4 and 5 megapixel" resolution can produce 11 x 14- or even 16 x 20-inch photo-quality prints. Four- and five-megapixel cameras also produce even better 8 x 10 inch prints than a two- or three-megapixel camera, which is more than adequate for high-quality, full-color, and full-page magazine photos.

Another significant, but less obvious, indication that image quality will keep advancing at a major clip: The physical size of the image sensor in 4+ megapixel digital cameras is generally twice as large as those in the previous generation (less than 3.4 megapixel) of cameras. This increase in size has occurred for two reasons.

✦ The cost of manufacture has dropped dramatically enough to make bigger sizes practical.

✦ Crowding more pixels into the same physical space was becoming counter-productive.

When the individual sensors that represent each pixel are too close together, electrical cross talk occurs and causes an unacceptable level of noise artifacts to appear in the image. Today's larger sensors exhibit far less noise, which results in better picture quality.

In fact, for many types of subject matter, as long as truly fine image detail and sharpness aren't of primary importance (think of Ansel Adams landscapes or hair-styling ads as examples of when sharpness is absolutely critical), today's best digi-cams enable you to make acceptable prints at virtually any size. However, you will have to understand processing workflow, know how to make use of high quality printers, and (probably) own some special purpose software for making larger images and prints.

Digital images can hold more information about the subject and technicalities of the photograph

Because digital images are stored as data, you can store all sorts of other data with them. Some cameras enable you to link to global positioning systems (GPS) satellites that can automatically annotate each image's time and location. Several cameras let you record voice annotations (and even ambient sound effects) in the camera.

Although it's still rare, the latest models of some cameras come with downloading software that lets you assign names to image files when they are being transferred to your computer (at last, no more filenames like `P00022.jpg`).

After you've downloaded digital images to your computer (or scanned them in), you can use image data-management software, such as Extensis' Portfolio, to categorize images by type and to assign numerous fields of descriptive data.

Finally, some late-model digital cameras such as the Nikon CP5000 also attach an EXIF information segment to each image. The Nikon CP5000 includes the following information in its EXIF file:

- ✦ Caption
- ✦ Date taken
- ✦ Resolution
- ✦ Protection attribute
- ✦ Camera ID
- ✦ Camera make and model
- ✦ Quality mode

✦ Metering mode

✦ Speed light (yes or no)

✦ Focal length of zoom

✦ Shutter speed used (exact to within tenths of a second)

✦ Exposure compensation

✦ White balance

✦ Lens

✦ Exposure difference

✦ Flexible program

✦ Sensitivity (ISO rating assigned)

✦ Sharpening mode

✦ Image type (color, grayscale, sepia, etc.)

✦ Color mode

✦ Hue adjustment

✦ Saturation control

✦ Tone compensation

✦ GPS latitude

✦ GPS longitude

✦ Altitude

As you can see, you can find out nearly anything you want to know about how and when you took the picture, and you don't have to be bothered with taking notes on your pictures. Due to the time constraints and the pressure of the circumstances, these notes are usually inaccurate, so this ability to record vital information can be extremely helpful. For me, this is a personal coup — more often than not, I forget to take notes that I should have taken.

Digital copies are identical to the original

Because digital images are simply numerical data, one copy of the file is exactly the same as another. As long as the data is kept intact, the image never degrades over time. A print made from a digital image a thousand years from now will look as good or better than a print made from the original. (The reason the image may look better is because printing technologies, papers, and inks are constantly being improved.)

This aspect of digital images concerns many art collectors, who fear that images will lose value when they can be reproduced too easily. The answer is careful registration and numbering of limited print editions, which have been in use for some time in photography, lithography, and many forms of printmaking. As long as the prints have been carefully and legally registered, there's no real reason why limited edition digital prints should be any less valuable.

A digital camera is the perfect artist's sketchbook

The resolution limitations of "point-and-shoot" digital cameras aren't a factor when you simply use the photograph as the basis for a "painting," as shown in Figure 1-5. You can enlarge the image to any size, and then use the brushes in your image processing program to paint over or smudge the original pixels. The result can look similar to many styles of traditional painting. You can also use plug-in filters to automate brush stroking over selected areas of the image.

Cross-Reference The methodology of photopainting is covered in more detail in Chapter 14.

Figure 1-5: Photo before and after being turned into a painting

At this point, you may be convinced that it's time to pitch your trusty Nikon F. Actually, you probably know or suspect that, as I said earlier, it isn't practical to entirely eliminate the traditional photographic processes. In fact, I doubt that it will ever be eliminated entirely. For one thing, the traditional photographic process has

a unique and familiar "look and feel," and that will always have a certain value among collectors and connoisseurs. More important, it will be some time before the cost of buying digital equipment can compete with the cost of analog equipment.

Digital cameras have new and exciting capabilities

Digital cameras can do things that aren't easily done with film cameras: shoot panoramas, combine several photos into one higher-resolution image, make short Web or demo videos, and do "motor-drive" rapid action sequences.

Many digicams come with software that enables you to combine a series of photographs into a seamless panorama, which can either be edited and printed from a single standard-format image file, or saved as a QuickTime panorama that you can view on a standard Web page through a standard image size window.

Shooting a short video with sound is a feature available on many digicams. These "video-ettes" are best for use on the Web or in presentation software as an eye-catcher, a documentary of how something works, or as a product demonstration. They typically max out at 320 x 200 pixels in size and about 15 frames per second (fps). TV-quality video runs at 30 frames per second and is typically two to three times the resolution.

Finally, many digital cameras perform one or more types of sequence photography:

✦ **Automatic bracketing,** in which the camera automatically changes the exposure for each frame by a user-specified amount of over- and under-exposure. Of course, one of these frames is also shot at the exposure indicated by the camera's internal meter.

✦ **2 to 5 fps "motor-drive" stills,** which can be very useful for ensuring the capture of a peak moment (such as Barry Bonds hitting the ball out of the park for the record-breaking 72nd time in a single season).

✦ **Time-lapse photography** that can make a movie from stills taken over long time intervals. This includes familiar items such as the 15-second weather report movie that shows how the clouds moved throughout the day.

The Advantages of Analog Photography

Conventional film photography offers the following advantages:

✦ Photographers are more familiar with the medium (although these days, you'd be hard put to find a pro who isn't comfortable with both film and digital cameras).

✦ The cameras are cheaper — especially those that have interchangeable lenses — than comparably featured digital cameras.

✦ Photographers don't require a means of downloading images when they are traveling.

✦ No "shutter lag."

✦ Accepted as a traditional medium.

✦ Easy and affordable to make archival prints.

✦ Known function and quality of components and manufacturers.

Lower cost of high image quality

The resolution of even the least expensive 35mm film (even if you use it in a ten-dollar "shoot and pitch" camera) is higher than all but the latest and most expensive of digital cameras based on 35mm single-lens reflex (SLR) film cameras. See Chapter 2 for more information on specific camera models. Digital SLRs with image resolution approaching that of 35mm film start at approximately $2,000—and move up rapidly from there.

Lower cost cameras

For the $1,000 you will spend on a state-of-the-art 4 or 5 megapixel digicam, you can buy a feature-packed, name-brand 35mm SLR that has all of the features demanded by most professionals: a carrying case, flash, tripod, and two or three supplementary lenses. This choice is illustrated in Figure 1-6. To look at it another way, the feature equivalent (regardless of resolution) 35mm pocket camera (with auto focus, zoom lens, optical viewfinder) will cost you between $100 and $300.

Figure 1-6: $1,000 worth of semipro digicam versus $1,000 worth of 35mm SLR film camera equipment

More versatility

The versatility of film cameras is just another way of looking at their lower cost. Digital cameras that feature interchangeable lenses, through-the-lens viewing, and that accept the full range of lenses and accessories made for 35mm analog cameras start at around $6,000. The same level of versatility in a conventional 35mm single-lens reflex camera run between $600 and $3,000 (depending on model and manufacturer).

Instant response (capture the moment)

A conventional camera captures the intended picture at the instant the shutter button is pressed. Top-of-the-line professional and prosumer digital cameras have come to the point where "almost" no shutter lag exists — however, "almost" no lag and the exact instant of shooting are still distinctly different time variables. More affordable digital cameras may take as much as a full second to record an image after you've clicked the shutter.

Accepted as traditional medium

The capabilities and qualities of conventional cameras are a known quantity to virtually any client. So, it may be easier to convince a buyer that you can produce a worthy result if you are using conventional equipment.

Easy and affordable to make archival prints

When it comes to printing color images from conventional film, analog camera owners have lots of choices, knowledge, experience, and competition. Buyers expect the product to have a reasonable life span, so they aren't timid about the long-term value of conventional prints. This is an especially important consideration for those who are interested in creating collectible or fine art prints. Be assured, however, that it is perfectly possible to make collectible digital art prints. You can even make conventional photographic prints from digital images (or have them made for you).

Consumer confidence

People have confidence in the value of their investment when they are contemplating the purchase of a conventional camera made by a long-established and trusted name, such as Canon, Hasselblad, Leica, or Nikon.

And the winner is . . .

At first glance, it may seem that the advantages of conventional photography make it the obvious choice. Think again. The advantages of digital photography make it irresistible to many of us — especially casual snapshooters, advertising illustrators, news and sports organizations, documentarians, and Web users.

However, conventional cameras are often the logical choice for capturing images destined to become digital images. I call this process *hybrid digital photography*.

Hybrid Digital Photography

Hybrid digital photography is just what its name implies: part analog and part digital. Hybrids can either start with analog cameras and film that end up being digitized by some type of scanner, or they can be digital images that are digitally recorded to conventional film and then printed on conventional photographic papers. For the purposes of this book, hybrid refers to conventional photos that have been converted to digital through the use of a scanner.

Make use of equipment you already own

You may have already invested a lot of time and money in learning and equipment — which doesn't have to go to waste. If you've made a successful analog picture, you can certainly digitize it. As this book was being prepared, scanner manufacturers were doubling the resolution of desktop slide scanners at the same time that prices were dropping. Desktop flatbed scanners have become dirt-cheap. You can even send an image out for drum scanning if you have really demanding imaging requirements.

Get the best of both worlds

You may not be able to adapt a 400mm telephoto lens or an 8mm fish-eye lens to your digital camera, but you certainly can interchange if you own a Leica, Cannon, Nikon, or other conventional interchangeable lens. If your usual subjects and clients require large- or medium-format conventional photography, you can convert the results from those cameras to digital.

Also, if you have requirements for both digital and analog versions of an image (and now that computers and the Web are such a big part of our lives, who doesn't?), hybrid digital photography is the shoot-once way to go.

Use established technology with predictable results

Hybrid digital photography has been around—especially in the analog-to-scanner version—for much longer than digital cameras. Service bureaus and prepress shops have been using high-end drum scanners for decades, and flatbed scanners have been around for nearly as long. This makes many users feel that digitizing tools are more accessible than digital cameras.

Get higher resolution for your buck

As stated previously, digital cameras are expensive relative to their analog counterparts, and only the most expensive (5 megapixel or higher) of these can match the resolution of medium-speed 35mm film. Because you can buy a slide scanner that creates an 18MB image for about the same price as a camera that produces a 4 or 5 megapixel image (roughly 14 megabytes), it's easy to see that hybrid digital photography will give you better definition per dollar.

Digitize existing images

No image is too old, too big, too colorful, or too precious to scan (or to photograph and scan). In other words, it's never too late to make an image digital. Remember, digital images maintain their data integrity forever, as long as the media doesn't deteriorate, isn't physically damaged, or accidentally erased. If you want to preserve the images forever, digitize them, make backups for safety, and recopy the originals every few years.

The Characteristics of Digital and Digitized Images

Digital images can be created from conventional photographic prints, negatives, or slides, or from scratch by using a digital camera. This book covers both processes. It also covers the basic techniques and aesthetics as they apply to either traditional or digital photography. More important, it covers those tools and techniques that are specific to digital photography in depth. So, the natural starting point is a description of the characteristics that define a digital (or digitized) image. Figure 1-7 depicts a digital camera workflow and a digitized photograph workflow.
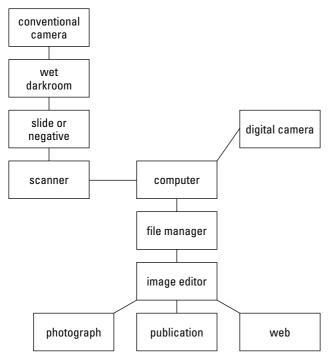
Figure 1-7: Digital camera workflow and digitized photograph workflow

Photographs, whether analog or digital, are composed of a mosaic of points of colored light, as Figure 1-8 demonstrates. In digital imaging terms, the color of each of these points of light describes both the color and the intensity of the light that is either reflected from or transmitted through any one of these points of light. The technical differences between analog and digital photography stem from the method of describing the color of a single dot, pixel, or grain of light.

In traditional photography, the *point* is a speck of a light-sensitive physical material that has been chemically processed to change the color of that material. In digital photography, the point is called a *pixel* (short for *picture element*). A pixel is one cell in a row-and-column matrix that is one shade of a particular color. That shade is represented in the computer as a piece of hexadecimal code, like this: 009139.

Note that not every digital image is a digital photograph. Digital photographs, by nature, must always fall into a category of computer graphics generally referred to as a *bitmap*. It is also possible (using such graphics software such as Adobe Photoshop, Live Picture, and Corel Painter) to create bitmapped images that are entirely produced by the hand and mind of the artist (that is, without the aid of a camera). In the analog world, these works are called paintings or drawings. Bitmaps are so called because all information is conveyed by assigning a specific color to each individual pixel in the image.

The other type of digital image is usually referred to in computerese as a *drawing* rather than a *painting* or *photograph*. Computer drawings are so called because most of the information in the image is defined by shape outlines, as they would be in a conventional technical drawing or engineering schematic. Digital drawings are technically categorized as vector images because all of the information in the image is described by geometric formulae (and by other formulae that describe such things as the characteristics of the shapes, such as line weight and color and shaded fills).
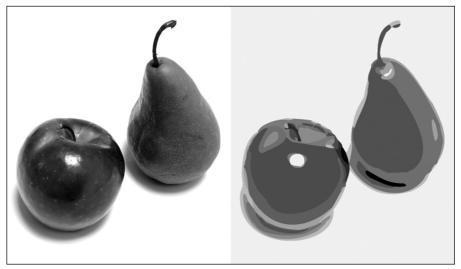
Figure 1-8: A bit-mapped digital photo and a vector-based digital drawing of the same subject

In the context of this book, a digital photograph can refer to either an image made with a digital camera or to an image digitized (scanned) from a conventional photograph. Because scanner technology has been with us longer than digital cameras, it has already been covered thoroughly in other publications. Therefore, this book will spend more time on digital camera technology than on scanners. Still, you'll find extensive information on the various types of scanners regarding those aspects of their operation that are specific to digitizing photographs. No time is spent on office-related scanner operations such as document archives, optical character recognition, or faxing.

The digital imaging process parrots recording an image on film. You still need a lens to gather and focus the light reflected from the surface of the image. That image is projected onto a light-sensitive surface. If the light-sensitive surface is film, the image needs to be chemically processed. If the result is a negative, the image must again be projected onto a light-sensitive surface and the result chemically processed into a print or transparency.

If the light-sensitive surface is digital, it consists of a chip array that converts the color and intensity of the light into numerical data. That data is then interpreted by computer software (either in or out of the camera) as an image containing a certain number of data points. The number of data points assigned to the picture determines the amount and sharpness of detail that can be discerned by a viewer. This characteristic of a digital image is referred to as its *resolution.* Resolution is expressed in pixels, a computer term that is short for picture elements. A pixel in a digital image serves the same function as a single grain of silver or dye in a film slide or negative, or of a dot in a screened image printed on an offset press.

Resolution

Resolution is referred to in several different ways. If an advertiser (or this book, for that matter) wants to give you a general idea of how much detail a camera is capable of recording, he or she will refer to resolution as VGA (approximately 640 x 480 pixels) or SuperVGA (approximately 800 x 600 pixels) if the image contains less than a million pixels. Prior to 1989, cameras capable of producing truly photographic prints up to 4 x 6 inches were referred to as *megapixel cameras* and were the highest-resolution cameras available for less than $2,000. Today, that criterion has been moved up to 5 megapixels. In fact, several 5 megapixel cameras sell for well under $1,000. The difference in price is primarily due to differences in features, user conveniences, and the quality of optics and viewfinders.

The only factors limiting the potential resolution of digital cameras are the cost of high-resolution image sensors and marketing considerations on the part of manufacturers. In fact, some digital cameras for professional studios exceed the resolution of 4 x 5-inch film. However, these cameras sell for tens of thousands of dollars. Keep in mind that in 1981, a typical desktop computer had 8MB of RAM and sold for around $5,000. Today, you can buy a computer with 256MB of RAM for under $900 and it comes equipped with many more features and peripherals.

A more accurate way to judge the resolution of a camera (or any digital image) is by its pixel dimensions. Width is always stated before height, so you will see figures on a spec sheet stated this way: 1,542 x 1,024 pixels.

You will also see image resolution referred to in terms of *file size.* File size is the result of multiplying the total number of pixels by the bit depth of the image, times the number of colors in the image, divided by 8 (because there are 8 bits to 1 byte). So, if we look at the 3.4 Mp, 2048 x 1536 Nikon 995 example, the file is in RGB color (three colors: red, green, and blue), and 8 bits of data are assigned to each color (as is the case with 24-bit color, also known as *true color*), the uncompressed file will be 4,681,728 bytes (4.7MB). The same file, if I were talking about a four-color CMYK (cyan, magenta, yellow, black) file, would be 9.4MB.

By comparison, an image from one of the new 5MB cameras would be just over 15MB. A roll of 35mm film scanned at 2,800 dots-per-inch is typically just over 18MB, as shown in Figure 1-9. Therefore, today's cameras theoretically come very close to being able to capture the quality of film. In fact, they come closer than the bare statistics may indicate because the digital images carry more picture detail (particularly in the shadows) and no generational loss of detail occurs as a result of scanning. In other words, the image quality from under-$2000 prosumer digicams is getting *very* impressive when compared to where it was even as recently as a year ago.

Note Film scanners that scan at 4000 dpi, although they can't record any more detail than is already in the film, greatly enhance color depth and minimize noise and other factors that contribute to generational image degradation.

2800 dpi scan

5 MP
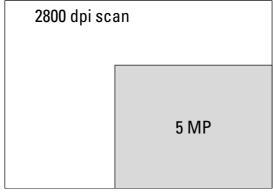
Figure 1-9: The proportional difference in image size between an image photographed with a 5 megapixel camera and one shot on film and scanned at 2,800 dpi (dots-per-inch)

Pixel depth

Another factor that influences the amount of perceived image detail is *pixel depth.* Pixel depth actually defines the number of individual shades of color that can be displayed when a file is printed or viewed. (For purposes of clarity, I'll momentarily ignore the characteristics and circumstances of the viewing device or material and the surrounding light.) A pixel depth of 8 bits per color allows us to represent 16.8 million colors in an RGB image. That's actually a few more colors (actually, colors and shades of the same) than human eyes can discern. Nevertheless, you gain the following benefits by assigning even more colors per pixel:

✦ The additional information can be used for other data, such as additional color channels for masking.

✦ You can capture a much wider range of color.

Therefore, if the scene that's being photographed ranges from very bright (the sun on fresh-fallen snow) to very dark (detail in the moss-covered rocks under the mountain stream), you have much more choice in how to process the digital information in that scene. Without the additional color depth, if you darken the highlights in an image that contains no information for those highlights, you just get muddy gray highlights. Conversely, if there is information in the captured image's highlights, darkening the highlight areas will produce detail in the highlights. The same is true of the ability to lighten shadow areas.

Cameras and image processing programs commonly record or store an image at more than 24 bits. That's 8 bits per primary RGB color. It's confusing, but it's becoming more "fashionable" for cameras and scanners to state their color depth in bits-per-color. So if your camera is recording at 12 bits, it's actually recording a 36-bit file. Many cameras record at 12 to 16 bits per color, but will only output to 24 bits (8 bits per color). You still get a big advantage because you can decide what range (contiguous portion) of the 30 or 36 (or even 48) bits that were captured will be included in the final image.

Bitmaps

Digital photos fall into the category of computer graphics known as bitmaps. The other type of computer graphic is called a *vector* or *raster graphic,* as shown in Figure 1-10. Vector graphics have some valuable characteristics, but nearly no application to digital photography, so you won't be bothered with them in the context of this book except when it comes to adding text or drawing paths in some image editing programs, such as Photoshop.

On the other hand, it's a good idea to develop a good understanding of how bitmapped graphics work. Pixels are square (or rectangular) and are arranged in a grid. Depending on the resolution of your camera, image file, or monitor, these pixels are arranged in a grid of rows and columns. Each of the "cells" in this grid is assigned a color (more specifically, a shade of a specific color). The changes in color within the grid make up the visual shapes in the image. If the grid cells are small enough, you can see subtle transitions between adjacent colors, resulting in an image that seems to mirror real life.

If the concepts in the preceding paragraph seem too abstract, think of a mosaic tile tabletop. The artwork on the tabletop is created by placing different colored ceramic tiles in rows and columns.

You need to know the following three things about bitmaps:

✦ You can't change the resolution of the image without having some effect on image quality.

✦ The higher the required definition, the higher the required original image resolution and, therefore, the larger the size of the file.

✦ The definition of the image has no direct relationship to the resolution of a print, printed page, film slide, or Web image made from that image.

These three facts will determine many of the decisions that you make regarding purchasing the components of the digital photography "food chain."
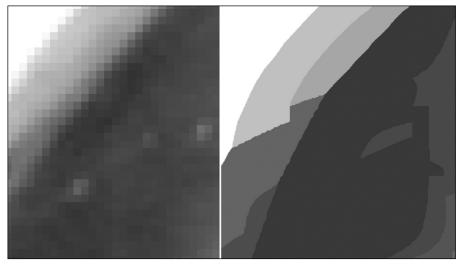
Figure 1-10: The image on the right shows a small portion of the image on the left after being enlarged 16 times without benefit of interpolation.

If you make the image smaller, some of the colored pixels have to be thrown out, resulting in lost detail. If you make the image larger, some pixels will have to be duplicated. Some programs, such as Adobe Photoshop, make very good guesses as to which pixels should be added or subtracted (and even as to how they should be added and subtracted so that edges stay smooth and sharp), but you will still experience some loss of sharpness.

The downside of higher resolution is that larger files will require more camera memory, faster processing in the camera to decrease the lag time between pictures, faster connection from camera to computer to transfer files, and more storage space on the computer that will do the processing.

Summary

This chapter provides an overview of digital photography and the reasons why digital photography will revolutionize your life as a photographer. My purpose is to use this chapter to give you a clear understanding of the difference between pure and hybrid digital photography. This chapter also covers the difference between straight-out digital photographs and hybrid digital photographs and when each was most likely to be appropriate to your individual needs. I've also emphasized that both have their place in the serious photographer's kit.

✦　　✦　　✦

Getting the Most from Your Digital Camera

This chapter examines various factors that you should consider before you buy a new digital camera—or before you make further use of the one you already own. Thinking about how these factors can affect your photography will help you make better use of the camera(s) that you own and help you make good decisions when you are upgrading or buying for the first time.

Maximizing Image Definition

The amount of image definition that you need depends on how you plan to use your digital images. For example, if you're just shooting pictures to share with friends on the Web or if you're only using your camera as a sketchpad for creating digital paintings, then you won't need a lot of image definition. The same is true if you prefer images that are blurry and emotion-packed.

At the opposite end of the spectrum, if your aim is to shoot wall-sized posters for hair salons or super-detailed nature photos for a museum exhibition, then you're going to need every bit of image definition that you can afford . . . and then some.

In the middle, if you're shooting images for magazine publication, you can generally get by with the level of definition afforded by cameras that produce 3 to 6 megapixels of resolution. Of course, the higher up that scale you go, the safer you'll be.

Most of us have been led to believe that the primary indicator of image definition (image quality) is resolution. In reality, several other equally (or nearly equally) important factors affect the definition of an image that a digital camera produces:

✦ Image resolution

✦ Lens quality

✦ Image sensor size

✦ Image bit depth

✦ Image compression

✦ File formats (JPEG, RAW, or TIFF)

✦ Length of the exposure

✦ ISO adjustment

✦ Camera steadiness

✦ Proper exposure

✦ Image treatment (after being transferred from the camera)

You can't get better image definition than you start with, and only when you fully appreciate this fact do you realize the importance of striving for as much definition as possible in your photographs. Although you can do a lot in digital imaging to create the illusion of greater definition than existed in the original, there's no true way to replace what didn't get recorded in the first place. Each of the following sections describes what you have to do in order to ensure the best possible image definition.

Image resolution

Image resolution describes the total number of individual pixels *(pixel* is short for *picture element)* present in the file. Each pixel is one "tile" in the matrix of single color tiles that are arranged in the rows and columns that comprise the image. The more pixels used to record the image, the more information that exists to describe the image. This is why image resolution is so often seen to be the criteria of potential image definition — because fewer pixels mean a coarser or "grainier" image.

The four different ways of expressing image resolution in pixels are as follows:

✦ **As the number of pixels in a given unit of measurement.** This is a linear measurement and includes measurements such as pixels per inch. If the resolution is 2,700 ppi, then a 35mm slide would be 2,700 x 4,050 pixels. (The 35mm slide image measures approximately 1 x 1½ inches.)

✦ **As an array.** This includes measurements such as 640 x 480. (When citing a dimension like this in this book, pixels are the understood measurement, unless other measurements are used in the same context that may confuse the issue.)

✦ **As a total number of pixels.** This is the result of multiplying the pixel (or dot) dimensions of the array. Thus, a 640 x 480 image has 307,200 pixels, and 1,280 x 960 image has 1,228,800 pixels — or 1.2 megapixels.

✦ **As the file size of the image.** This is the result of multiplying the pixel dimension of the image by the pixel depth of the image and then dividing that number by 8 (the number of bits in a byte). Thus, the file size of the 640 x 480 image, if it is recorded in 24-bit color, is (307,000 x 24) (8 = 921,600, which is popularly rounded off to 920K.

The issue of resolution is mightily confusing to many of us, mainly because so many of the devices used in digital photography have an inherent resolution of their own that interacts with the resolution of the original digital/digitized file. The relationship of image resolution to the resolution of output devices is discussed in Chapter 17 in the context of how to output to various devices. At this point in the book, though, it's sufficient for you to know that no direct correlation exists between image resolution and output resolution. In other words, no amount of output resolution will result in more definition than existed in the original image.

Lens quality

You can find authoritative reviews of virtually every digital camera in existence in the digital photography magazines, on the Web sites of many of those same magazines, or various digital photography Web sites. Of course, if you are the proud owner of one of the simpler digital cameras, just check the reviews for what others think of the image quality of the camera you plan to buy. If, on the other hand, you need the best image quality you can afford, your own testing will prove to be worth the time invested.

To test a lens before you buy a camera is a bit trickier proposition, but here's how you go about it:

1. Go to your local professional camera store (you can tell if it meets that qualification if it has lots of studio strobe lights and darkroom equipment in stock) and buy a lens-testing chart. It should be large enough to fill the camera's frame from a distance of three to four feet.

2. Buy the type of memory card used by the camera that you're most interested in. If you're upgrading your digital camera, you may want to buy a camera that uses the same card so that you don't also have to buy new memory cards. You'll want to take a look at the "Digital Film Type" section later in this chapter to find out how to get maximum lens quality for your investment.

3. Take the memory card and the test chart and a tripod (this is absolutely necessary — the store may be able to loan you one) to the store that you want to buy the camera from. Go during a slow period so you'll be more likely to get the store's cooperation.

4. Ask permission to shoot a lens test. Prop or paste the lens chart to a flat vertical surface (it may have to be outside the store window).

5. Put the camera on a tripod, and use a string to connect the center of the lens to the center of the lens chart. If the string is perpendicular to both the chart and the lens surface, you can be certain that the lens chart and the lens surface are parallel, as shown in Figure 2-1.
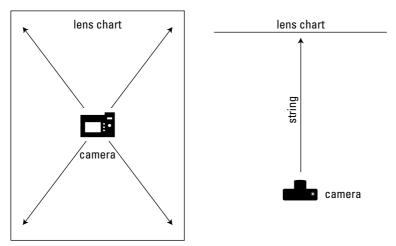
Figure 2-1: The position of the camera in relationship to the position of the lens chart

6. Take a picture of the chart. Use the camera's LCD monitor as the viewfinder and frame the chart so that the outer borders are as close to the edge of the frame as possible.

7. Repeat the first six steps for all the cameras you want to test.

8. After you've made the test chart exposure, shoot a street scene and a self-portrait outdoors in the shade. That way, you'll also have some real-world images from each camera to compare for quality. For all the test shots, keep the camera tripod mounted and use the self-timer so that "camera shake" isn't a factor.

9. Take the memory card home (or to a photo processing place that can print digital images directly from memory cards) and print out the test chart image from each camera. Be sure to use the highest quality printer available.

10. Examine each test chart print carefully, and ask yourself the following questions:

- How sharp is the picture at the corners and at the edges?

- How much contrast exists between the lines and the type? (More contrast is better.)

- Do the lines at the edges of the frame bend? (Don't be alarmed if they do — some barrel or pincushion distortion is typical of digicams priced under $1000. Just make sure the bending isn't extreme.)

You should see results similar to those shown in Figure 2-2.
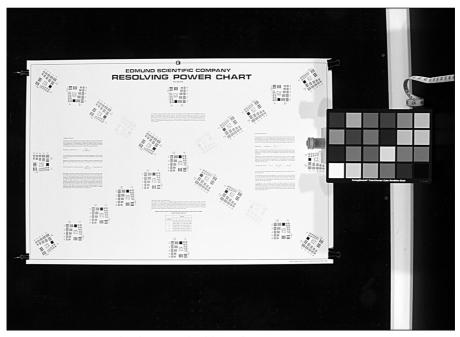
Figure 2-2: A properly photographed lens chart
Courtesy of Sciencekit and Boreal Laboratories

Certain lens characteristics are as important as — if not more important than — the optical quality of the lens. In my opinion, the most important of these characteristics are the following:

✦ A large maximum aperture (usually called a *fast lens*)
✦ Macro focusing capability

✦ Threaded lens barrel

✦ 3:1 (or more) zoom lens

✦ Movement canceling mechanism

Having a large maximum aperture is important because it allows you to shoot spontaneously at lower lighting levels, such as those you encounter at dusk, at indoor events and public places, and in bad weather. That's because larger apertures let in more light, so you can take pictures at higher shutter speeds than would otherwise be possible. The effect of various shutter speeds is illustrated in Figure 2-3.

Figure 2-3: The photo on the right was taken hand-held at $\frac{1}{125}$th second, and the photo on the left was taken hand-held at $\frac{1}{30}$th second.

You will also notice in Figure 2-3 that there is little difference in sharpness between the subject and the background of the image that was shot at the smaller aperture. A faster (wider aperture) lens than the one used would have produced less depth-of-field, thus softening the background more. A softer focus background would have helped to focus out attention on the subject.

Macro photographs are pictures of small objects taken from very short distances. One of the things I really value about my Nikon digital cameras is their outstanding ability to do macrophotography. Most Coolpix models can focus at distances of under one inch. If you want to be able to capture small details, then you definitely want a lens that can focus down to less than one foot.

Threaded lens barrels are extremely useful because with them, your camera will be able to securely mount lens accessories. These accessories may include items such as macro adapters (the solution to close-up photography for cameras with less-than-ideal macro focusing lenses), color and special effects filters, and supplementary lenses for telephoto and wide-angle use.

You also want a zoom lens that, at minimum, ranges from moderate wide-angle (about 38mm) to moderate (sometimes called *portrait*) telephoto. That is because in-the-field digital cameras still don't have high enough resolution to make cropping a desirable choice, so you want to be able to frame your picture in-camera as often as possible. The more resolution you have in the original image, the more flexibility you have in the resolution at which it can be printed at some future date for some unforeseen reason. Some cameras have much greater than 3:1 zoom ratios, but they are generally lower resolution because they want to combine extreme (as much as 400 mm) telephoto capabilities with an image stabilizer. Often, these image stabilizers work with electronic gyroscopes that move the image on the image sensor to compensate for any movement caused by the unsteadiness of the camera. This issue brings us to the next lens capability worth looking for: an image stabilizing mechanism.

Image stabilizing mechanisms for digital cameras with non-removable zoom lenses are (so far, at least) found only in cameras with greater than 5:1 zoom ratios. This is because they provide the most noticeable benefit for 200mm and higher cameras. Image stabilization enables you to catch fast action from a distance (and when it's too crowded or otherwise impractical to use a tripod) and still get pictures that aren't blurred due to camera shake.

Image sensor size

The larger the image sensor, the less likelihood of excess electronic cross talk between the individual light-sensitive cells that capture each pixel in the image. This cross talk can cause image artifacts or noise — the equivalent to grain in an analog photo — and less accurate interpretation of color. The effect that this noise can have on an image is demonstrated in Figure 2-4.
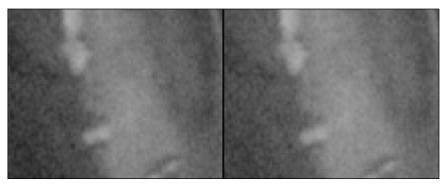
Figure 2-4: The same portion of an image with and without noise artifacts

Someplace on the specification sheet, you'll find the size of the image sensor. Unless the camera is larger than 35mm, the image sensor will most likely be either ⅔-inch or ⅓-inch. If the camera is a professional camera based on a 35mm camera body (or something that looks and feels very much like one — as is the case with the Olympus e10 and the Olympus e20 — you can be sure that the sensor is at least ⅔-inch. If the camera is a 3.4 megapixel or lower resolution prosumer or consumer camera, the sensor will typically be 50 percent smaller at ⅓-inch.

Image bit depth

All digital cameras record at least eight bits of information for each pixel, resulting in 16.8 million possible variations of hue, saturation, and brightness. (In digital photography, the combination of these three items is called a *color* — go figure.) Most of the time, that's all the color information we can perceive. However, our eyes and nature play tricks on us. Even though we can't technically see more than 16 million colors at a time, our eyes will often adjust to collect a greater range of information over a few fractions of a second. Our minds will remember having seen all that color information in the same instant. Consider a similar phenomenon: a single motion picture frame looks much blurrier and has lower definition than the movie that it belongs to. So when we look at a print of a still, our minds are locked into seeing as much color information as is actually in the print. If you like to shoot highly detailed images, a lot of that detail comes from color information that our minds can see over time. So if you can record more color information than you can see, you can then decide exactly which parts of that information you want to see when the information is processed in an image editor that can work from 16-bit color files. Even if the camera records 12 bits, that's 50 percent more color information than usual.

Image compression

Virtually all digital cameras save their files in JPEG format (`.jpg` file extension), which squeezes files down to a fraction of the size that they would be if not compressed. JPEG files achieve this compression by considering shades of color that are very close together to be the same color. Generally, you can make a choice in the camera's menu as to how much compression you want the camera to use. The compression level is generally given on the menu as a quality level. For example, on the Nikon Coolpix 5000, you have a choice (from best to worst) of High, Fine, Normal, and Basic. The best quality compression will cause the least (usually discernible only to the practiced eye) loss of image definition. The trade-off is that you can store more images in the camera at lower-quality compression. Also, lower quality files, because they are smaller, upload to the Web at much higher rates.

File formats (RAW or TIFF)

If you want to ensure the highest definition images and if you have a camera that lets you save your files to an uncompressed format (usually either RAW or TIFF), then take this option. However, be aware that the best quality JPEG offered by most 5 megapixel cameras will store a file that is approximately 1.25 megabytes (¼ the size of the original). The same file, saved as a TIFF, will be approximately 15 megabytes (four times the size of the original and then three times that in order to separate each interpolated primary color into its own RGB channel). So you can see that quite a bit of data is lost when you compress the file, even though it may not be obvious. Many of the newer cameras will also let you save to a RAW image format, which is usually a 12- or 16-bit file. You will eventually have to edit it down to an 8-bit file in order to save it to a standard format, but you will have far more color information to choose from when deciding which areas of detail you want to keep.

If your camera is capable of saving files in RAW format, it will save the file in a completely lossless, non-compressed file format that is capable of storing as many bits of data as the camera can handle. Many of the newer digital cameras (and virtually all of the professional models) capture 12 to 16 bits of color information, which gives you lots of choice over how much and what parts of that data will actually be kept in the file (provided the camera doesn't make that choice for you). Many of the newer semi-pro digital cameras capture 12 bits of data per pixel, but then pick the range of colors that shows the most detail and automatically store that in an 8-bit file. Check your camera's menus or the manual to be sure that the camera saves to RAW files and what file format extension it uses. After you've determined this, follow these steps to open a RAW data file in Photoshop 7:

1. Choose File ⇨ Open or File ⇨ Open As (Windows).

2. From the File Format menu, choose RAW. If the current folder contains RAW files, they will appear in the file list. Highlight the files that you want to open, then click the Open button.

3. In the Width and Height fields, enter the dimensions of the file. You can click the Swap button if you want to reverse the dimensions in the Width and Height fields in order to open a file with the same dimensions as a previously opened file, but that is oriented vertically rather than horizontally (or vice versa).

4. In the Channels field, enter the number of channels (if you don't know, 3 is the likely number).

5. In your camera's manual, find the statistics for the header, color depth, and byte order, and check whether files are saved with an interlaced data option. Enter this information into the appropriately labeled fields.

Tip   I type this information into my computer, print it out, and tape it to the bottom of each camera that I use. Then I don't have to look it up every time I download.

6. If you don't know and can't find the dimensions or header value (usually the same for any given camera), Photoshop can "guesstimate" the parameters. You do need to have either the correct height and width values or the correct header size and then click Guess.

7. If you choose the Retain When Saving option, Photoshop will memorize the header when you click Save.

If you foresee occasions when you'll want all the image detail that you can possibly squeeze out of the camera, be sure to look for a camera that lets you save to TIFF or RAW image formats. However, you won't want to use these formats unless image quality is critical. Overuse of these file formats may mean that you'll have to be tethered to a computer for storage or you'll have to use a camera with a 1GB Microdrive installed so you won't be downloading every five minutes.

Length of the exposure

If you have to keep the shutter open longer than about ⅛th second, chances are you will pick up some cross talk between individual pixel sensors that creates noise (grain). How much noise you get depends on how much longer the shutter stays open.

Cross-Reference   I show you some techniques for getting rid of (or at least minimizing) such noise during the image editing process in Chapter 16.

Some cameras, such as the Nikon Coolpix 5000 and the Olympus e10, have built-in noise reduction modes that help quite a bit. However, most cameras will force you to use less than maximum image size when noise reduction is turned on.

Here's a tip for getting around the size limitation, as long as your camera has a noise reduction feature:

1. Turn on your camera's noise reduction feature.

2. Choose the largest image size that you can. You probably won't be given the choice of any sizes larger than permitted because you've already chosen noise reduction.

3. Take the picture.

4. Transfer the image to your computer for image processing.

5. Use one of the third-party filters (Genuine Fractals Print Shop or Shortcut S-Spline) that is made specifically for keeping sharp, smooth, well-defined edges in the pictures that you enlarge. As a rule, it's a good idea to make sure that the original file is at least 2MB in size.

ISO adjustment

The next factor that contributes to noise is adjusting your camera to raise the *ISO rating* (the camera's sensitivity to light). Most cameras default to a setting that lets them automatically raise the ISO rating whenever there's too little light for a shutter speed slower than the manufacturer deems safe for a reasonably blur-free, hand-held shot. I have a friend who can get a razor-sharp shot a ½ second long, but for most people, even a bit of practice won't help them achieve a steady shot at less than ¹⁄₆₀th second.

Tip The difference between my rock-steady friend and the rest of us is practice, practice, practice. Wrap the neck strap around your body so that it's taut and press the camera tightly to your face. Use the spot meter mark in your viewfinder or the center of your LCD and concentrate on making sure that it doesn't jiggle. Take several long, deep breaths to relax and calm down. The biggest cause of blur is jangled nerves due to excitement or pressure. If it's cold, dress warmly. Exhale the last deep breath very slowly while squeezing the shutter release.

The same thing happens when you pump up the ISO as when you keep the shutter open — you get cross talk noise from the sensor.

Not all cameras have noise reduction. Several methods for removing noise in your image editor are covered later in this chapter. Another option is third-party software, called Grain Surgery, which is dedicated to the task of controlling noise. Grain Surgery is a Photoshop-compatible filter offered by a company called VisInfo.

Cross-Reference I show you how to use Grain Surgery in Chapter 16.

Proper exposure

Remember that one of the great advantages of digital photography is that test shots are free and you can see the results immediately. Keeping that in mind, try to find an exposure that will capture as much image information to your file as possible from the subject you are photographing. As long as the information is present, you can control brightness and contrast in any or all of the images during the image-editing process.

If you have time before your subject moves, try bracketing. *Bracketing* is a photographer's term that means you've taken at least extra shots of the same picture — one or more that are overexposed and one or more that are under-exposed. Typically, you would make the over and under exposures at intervals of one-third to a full f-stop. Of course, if you're going to do your bracketing with your own choice of settings, you have to place your camera in manual exposure mode. Alternatively, many digital cameras have a shooting mode called *auto-bracketing* that will automatically create a series of exposures over a (approximately) one-second interval (or for a

specified number of shutter clicks, each one-third to a full-stop apart). If you're shooting scenics, architecture, or still-lifes, auto-bracketing is great insurance that you'll get more image data in one of the shots than in the others. If the camera is anchored so that it doesn't move between exposures, you can stack all of the parts on image layers and then use different parts of bracketed frames in different parts of the image to ensure maximum detail.

Camera steadiness

If the image blurs because the camera shook or the subject was moving too fast, you're going to lose a lot of detail. No amount of after-the-fact image sharpening will recover it for you, either. If you want maximum detail, always use a tripod or other rock-steady camera brace. The difference between these two techniques is illustrated in Figure 2-5. Using some means to fire the camera that doesn't involve poking it with your finger — either a cable release, remote control, or self-timer — can also reduce the blur in an image.

Figure 2-5: The difference between hand-held (right) and tripod-mounted (left) exposures at ⅟₃₀th second

The least expensive and most reliable of these devices is the good old-fashioned cable release. Unfortunately, modern business practice dictates that companies find ways to make you spend more money than necessary rather than attempting to give you maximum practical value. Thus, exceedingly few digicams come with a cable release thread. Personally, I'm baffled by the fact that companies such as Olympus and Canon include much more expensive electronic cable releases with their cameras, but thank heavens they do. Others, such as Nikon, make electronic corded releases that they will be happy to sell you for around $100.

Image treatment

It's easy to overlook, but if you want to maintain maximum image quality, you can never, never, ever re-save a JPEG image. That is because the image-editing or

previewing software *almost* always resamples the image each time it is re-saved. So each time you re-save, you lose a little more data.

You can open a JPEG as much as you like, but you have to simply close the file without saving it. Make sure you don't use a program that automatically saves files when you close them without first warning you.

Here's what you really have to watch out for: Don't use a program that resamples the JPEG image when you rotate it. Many cameras come with transfer software (such as Nikon's Nikon View, version 4.1 or later) that will let you rotate the image without resampling it.

If you want to see your image right side up, be sure that your image previewer (which may be your operating system if you use Mac OS X or Windows Me or — especially — Windows XP) doesn't resample the image in the process. The File Browser in Photoshop 7 and Photoshop Elements 2.0 is very safe. It rotates the thumbnails, but only rotates the files themselves when you open them, in which case you have the opportunity to save to a non-lossy format, such as PSD or TIF. If you can't find out from reading the literature whether the image previewer that you are using resamples the image, then send your software manufacturer's support team an e-mail and ask.

Here's how to be sure you've saved your precious images to a lossless format:

1. **Open your image in a respected image-editing program.**

   If the photo was shot vertically and the image previewing software won't rotate it without resampling, then now is the time to rotate it. After all, you're never going to be able to use it in horizontal mode. Heck, you may not even know if you like the picture until you see it upright.

2. **Save the file as a TIFF file.**

   Immediately issue the Save As command, which can usually be done by choosing File ➪ Save As. Usually, a Save As dialog box is available that enables you to save the image to one of several file formats. Save the file to TIFF (`.tif`) format. (If you're incredibly picky, don't use LZW compression, though it's virtually lossless.) Your file now takes up more room on your hard drive, so be sure to save only those files that you're likely to use.

3. **From now on, use the TIFF version of the image for any image editing.**

   This will ensure that you'll always be able to go back to a virgin copy if you want to give the image a new interpretation.

Shutter lag

One of the problems traditionally inherent in digital cameras has been the delay between the instant the shutter release is clicked and the instant the shutter itself clicks. The technical term for this delay is *shutter lag*.

The problem with shutter lag is that it prevents you from being able to accurately predict what's going to be happening when the shutter fires. For example, your friend looks perfectly perky when you push the button, but by the time the camera actually takes the picture (sometimes as much as a second later), her mouth is drooping and one eye is closed.

One way to solve the problem of shutter lag is to spend more money on your camera. The Olympus e20, the Nikon Coolpix 5000, some of the newer cameras with 10:1 ultra-zooms and image stabilization that are especially made for fast-action reportage, and almost any professional SLR made since the turn of the century are lag-less (or so close to it that you'll hardly notice the lag).

Those on a more normal budget can do a few things to minimize shutter lag. First, choose your camera carefully. If shooting speed is critical, it pays to do some research before you purchase a camera. Some digital cameras are capable of two to three shots per second. On the other hand, some cameras take as much as three to seven seconds between shots. In the consumer range of digital cameras — those priced under $1000 — much of the delay between the moment that you press the shutter until an image is captured is caused by focusing and setting the exposure in auto mode. However, you may be able to cut the delay between shots.

The following tricks are very effective at cutting shutter lag — even for cameras that hardly have any lag:

✦ **Prefocus.** By pressing the shutter release button halfway down, most cameras will figure out the focus and lock it in, so the camera doesn't have to try to focus when you finish depressing the shutter to actually take the shot.

✦ **Preset the exposure settings.** Half-depressing the shutter release can also lock the exposure settings. Better yet, if you can use fully manual exposure settings, the camera won't have to waste any time at all calculating exposure.

✦ **Turn off the camera's LCD display and image-review function.** Like most of these techniques, this works because it lightens the load on the camera's computer and conserves power.

✦ **Turn off the flash.** If the camera is waiting for the flash to recharge, then all the other things you try won't matter much. If you really need flash and your camera has the ability to use an external flash, then get one. This way, the juice and calculations needed by the flash are off-loaded from the camera. Your camera's batteries will last longer, too.

✦ **Use a "continuous" mode.** Some cameras have a rapid sequence mode that is a sort of electronic motor drive. Rapid sequence modes sometimes use a smaller image size or higher compression, but might help capture that action shot you have been trying to get.

Delay between shots

After the capture has begun, the speed with which the camera can write the image to the memory card is pretty much up to the camera's design. The most important factor that impacts the speed of transfer is the size of the camera's memory buffer. The larger the buffer, the more images you can capture before permanently transferring them to the flash memory card (digital film card). To minimize the delay when transferring images, try any of the following steps that can be employed by your camera model:

✦ **Consider using smaller memory cards.** The BIOS programming of some older digital cameras prevents them from writing accurately to memory cards past a certain capacity. If this is the case for your camera, its manual should inform you what that card memory limitation is. Also, you can ask other users of your camera for info on this subject.

✦ **Consider using faster memory cards.** There are some cards that operate faster than others in some cameras. Lexar and Sandisk are constantly battling one another with speed claims. Check them out in a store than sells more than one brand.

✦ **Use a smaller image size.** When speed is critical, smaller images create smaller image files and thus process faster in the camera. A 640 x 480 image of the shot you needed is better than not getting the shot at all with the camera set to 1280 x 960.

✦ **Adjust image quality settings.** This one is a reach, but it might be worth an experiment. The compressed size of the image or the amount of processing it takes to compress it may have an effect on the camera's processing speed.

Understanding Operating Modes

Almost all digital cameras give you a choice of special modes of operation. Not all of these modes are found on every camera, but knowing what problems each of these modes can solve may ease your picture-taking stress and help to ensure picture-taking success.

Automatic mode

Almost all digital cameras give you a choice between fully *automatic* (sometimes called *programmed*) shutter priority and aperture priority. More advanced cameras also give you the choice to use fully *manual* exposure settings.

Automatic mode is the right choice in the following circumstances:

✦ You don't know Jack about how to use this camera.

✦ You just barely have time to get the shot, and there's no time to fiddle with settings.

In fully automatic mode, the camera uses the slowest shutter speed consistent with a steady shot in conjunction with the smallest aperture that will ensure a decent exposure. The result is that — even if you don't have the time (or the experience) to stop to make the calculations — you'll get a reasonably blur-free shot with maximum depth-of-field.

I make it a rule to leave my camera set in automatic mode so that when I turn on the camera, I've got at least an 80 percent chance of getting a technically decent image. This is an especially good rule for digital photography because you can do so much more to control focus, blurring, color balance, and composition in your image-editing program. Thus, your priority should be to have a good starting point. Moreover, if I have to hand off the camera to someone else, they stand a decent chance of getting a decent shot, too. Sometimes the other person is in a better position to get the right shot (especially if you're driving or want them to take a picture of you).

> **Note**   When you put the camera in fully automatic mode, the camera invariably sets the flash to fire any time it is forced to use a shutter speed of less than $\frac{1}{50}$th of a second (or whatever that camera's manufacturer deems to be too slow to ensure a reasonably steady shot). Personally, I'd rather have a somewhat blurry shot taken in available, natural-looking light than by the ugly light of a built-in flash. As a result, I've gotten into the habit of turning off the built in flash when I put the camera into automatic exposure mode. The camera will beep or flash a red light when it senses that there's not enough light for a hand-held exposure. At that time, you can decide whether you really want to use the flash.

Aperture priority and depth-of-field

When you choose aperture priority, you are able to set the f-stop (the little hole, also called the *aperture,* that determines how much light passes through the lens) so that it remains at that setting until you intentionally change it. This allows you some control over *depth-of-field,* which is the distance between the closest and farthest points from the lens that are in sharp focus.

Depth-of-field control is typically more difficult to control in digital cameras than in film cameras because the "film plane" (actually, the sensor surface) is two to four times closer to the center of the lens. This increases depth-of-field to the point that it is difficult to take a picture of a subject in bright light that is more than three feet away in which everything in the picture isn't at least fairly sharp. True, the distant mountains and trees may be a bit soft around the edges, but they're still easily recognized for being what they are.

Thus, the most important reason to use aperture priority is to control depth-of-field for portraits and other subjects that are even closer to the camera. For those pictures, set the camera's f-stop to the smallest number (widest opening) available.

Note For some reason, the industry decided to give the largest apertures the smallest numbers. To make matters worse, although the aperture is set in the same way and with the same controls on almost every film camera, the digital camera makers have chosen to put these controls on a different menu or knob on almost every camera. This is something you *must* know how to do if you're going to get the most from your camera, so please read the manual.

Aperture priority is helpful in a couple of other situations, such as the following:

✦ To ensure the fastest possible shutter speed in dim available light by forcing the widest possible aperture

✦ To ensure interminable depth-of-field by using the smallest possible aperture

Shutter priority

Shutter priority is a shooting mode that gives you the choice of shutter speed setting, at which point the camera automatically chooses the aperture needed to make a "correct" exposure.

You should use shutter-priority to accomplish the following:

✦ Force a slow shutter speed when you want to make certain that the picture is going to be blurry enough to "put the body in motion" or to enhance the feeling that things are just out of control

✦ Force a high shutter speed when you want to make sure that your jitters won't blur the shot

✦ Force an even higher speed when you want to freeze fast action, like freezing the soccer ball as it bounces off the goalie's head

Full manual control

As you gain experience, you'll be able to recognize when a particular shutter speed and f-stop combination will produce a specific result or will give you your most consistent chance at the right shot, given a specific set of prevailing conditions, such as strong backlighting.

Full manual control is also an advantage when a subject is moving through a background that constantly changes in brightness. You know that the main subject must be perfectly exposed and you don't want to have the background (or moving traffic lights or other photographers' flashes) giving your camera the wrong signals.

Full manual control is especially important to digital photographers when shooting panoramas. You need to be able to freeze the camera at one specific setting. Otherwise, the overall brightness of the image will change as the angle of the light in relation to the angle of the lens changes. This situation makes it much more difficult for panorama software to seamlessly join the individual frames that will make up the panorama. You will find a full discussion of how to make a panorama and how panorama stitching software works in Chapter 16.

Full manual control is actually a convenience when your main lighting source is strobes that aren't set on automatic. Most studio strobes fall into this category. You want to be able to take a reading with a strobe meter that can read the flash's brief burst of light accurately. You then want to be able to set your camera according to the dictates of the external meter.

Finally, you will encounter other occasions in which an external meter is a better choice than your camera's internal meter. Of course, you can't use an external meter effectively if you can't follow the meter's advice when setting your camera's aperture and shutter speed. An external meter is virtually indispensable if you need a more accurate spot meter for reading a small point of light against a dark sky. An external meter is also useful if you want to use an incident light meter that measures the overall amount of light falling on your subject scene, rather than how much light is being reflected by the coal in the bin or output by the Christmas tree lights.

White balance

Most digital cameras will automatically make their best guess at setting the proper color balance or white balance for the prevailing light falling on the scene. The terms *white balance* and *color balance* have slightly different meanings, but the terms are often used interchangeably. When the white balance is correct, anything that's white actually looks pure white. Whenever the whites are white, the other colors in the photograph are also likely to look natural. This is the case because any overall color tint has been removed in order to achieve white balance. However, like Hal, the computer doesn't always make the decisions that are right for you.

The overall color tint of an image is caused by the color of light that falls on the scene. Your eyes and brain automatically compensate for the colors of objects when viewing them under different lighting conditions. Cameras can do the same thing if they're equipped to compute the necessary calculations or if you place a filter over the lens that rebalances the color of the prevailing light to that of daylight on a cloudless day. If you take a photo of the same subject at dusk, the prevailing light will be significantly warmer (more yellowish/orange). The same subject photographed with tungsten light the same subject will appear to the unadjusted camera to be almost completely orange/yellow.

Digital cameras can adjust to compensate for these changes in lighting conditions, and most default to doing this automatically. However, there may be times when you want to deliberately set a particular color balance. For instance, perhaps you want to convey a particular mood by making the overall tint warmer (more yellow) or cooler (more blue). In those cases, it helps if the camera gives you the choice of setting white balance for daylight, tungsten, or fluorescent lighting. Some cameras will even give you choices for specific lighting conditions, such as Dawn, Dusk, and Overcast.

All image-editing software will allow you to change the overall color balance of a photograph. However, you do gain some real advantages by getting the white balance right in the camera, chief of which is that you will want to be able to preview whole folders full of pictures without having to be embarrassed by the presence of off-color images. This is even more important if you have to preview the pictures for a client before he or she decides exactly which ones will be used. Also, having white balance correct in the original image makes it easier to judge which pictures are "keepers." Finally, if the camera corrects the white balance, there's less to do before you can be proud to email the picture to a client or a friend.

Shooting under indoor lighting conditions is one situation in which you are better off to use a color filter to correct lighting. This is because if the camera (or your computer software) has to re-calculate such a drastic difference in color balance, it will create a substantial amount of image noise (graininess) in the process.

Here's the cure: Get yourself an 81A filter that's used in conventional photography for converting the temperature of tungsten light to daylight. Then when you're shooting indoors at night, you can just shoot through the filter. A side benefit is that you'll get a better quality image because the camera won't have to reinterpret the range of colors originally recorded by the sensor. You see, what your camera does when it makes white balance adjustments is pretty much what you do in your image-editing program. The difference is that your computer has a lot more computing power and the program has room to employ much more comprehensive algorithms for making those adjustments.

Note   The best possible solution is to have a setting that enables you to measure white balance from a neutral surface. From your camera's LCD menu, choose the Manual White Balance setting. Next, place a neutral surface, such as a sheet of typing paper in front of the camera, and press the shutter button partway. You'll get a perfect white balance setting for the light that you're currently in. It won't matter a bit if strange colors are reflecting from brightly painted walls or that you're shooting paintings or colored fabrics, because you're taking the reading from something you know to be perfectly neutral in color.

Programmable (or pre-programmed) settings

In addition to the priority options previously listed, many digital cameras enable you to program your own settings or provide various pre-programmed settings. These settings apply to different situations that you may encounter as you are taking photographs and they fall into two types: pre-programmed and user-programmable. Because nearly every digital camera manufacturer offers different options, I'm going to list only the most common pre-programmed situational settings. You can only use one of these settings at a time:

✦ **Backlighting:** The camera is automatically set to overexpose by one or two stops in order to expose for the shadows and let the highlights block up. This setting is most commonly used for sunlit portraits (including pets) when the photographer chooses not to use fill flash.

✦ **Fill flash:** The flash is turned on, even if there's plenty of direct sunlight. This causes the flash to light the shadows when direct, unfiltered sunlight creates too harsh a contrast between highlights and shadows.

✦ **Snow:** The camera uses an aperture one to one-and-a-half smaller than normal to compensate for the brightness of the snow so that you will be able to see some detail in a snow-covered landscape. If you shoot people in the snow, use the Backlighting or Fill flash settings instead.

✦ **Portrait:** The lens is set at or near the widest available aperture in order to limit depth-of-field. Then, when the camera automatically focuses on the face, the background should blur enough to make the subject stand out from it. Portrait mode is also good for plants, pets, and some still-life photography. (For commercial still-lifes, you usually shoot in a studio against a plain background using very bright flash that permits very small apertures, in order to ensure that all the important characteristics of the product stay in sharp focus.)

✦ **Action:** The highest possible shutter speed consistent with proper exposure is chosen. Some cameras will also turn on the flash if the subject is focused to within flash range and there is too little light for maximum shutter speed.

✦ **Cloudy Weather:** The image contrast is increased, the color balance is warmed slightly, and the color saturation is increased.

User-programmed settings enable you to choose how you want the camera to be set up — including the use of any of the controls that happen to be features of your camera. You do this by switching to a "programmed" mode and then choosing various options from a menu on the camera's LCD. Some cameras enable you to save these setting under a name of your choice (for example, Action Still-life or Super Blur), while others only let you save them to a numbered set. It is then up to you to remember what a given-numbered set is used for.

Auto bracketing

Auto-bracketing is one of those marvelous tricks at which digital cameras excel — provided the camera has a large enough RAM buffer to permit storing at least three images before writing them to the memory card (which can take several seconds). The purpose of bracketing is to ensure that you get the exposure that makes the picture look as close to the way you want it to look as possible — regardless of what the camera's stupid computer thinks.

Best-Shot Selector

The Best-Shot Selector (BSS) seems to exist only in the Nikon line of digital cameras. Nevertheless, I must mention it here in the faint hope that other manufacturers will find a way to incorporate a similar feature.

BSS takes a rapid-fire sequence of images for as long as you keep the shutter button depressed, and then automatically discards all but one of them before writing the image to the camera's memory card. The image that the camera keeps is the one that shows the highest contrast between contiguous lines of adjoining pixels. To put that in English, it throws out all but the sharpest picture.

This little trick does amazing things for situations in which you have to hand-hold the camera, when there's not enough light for a high shutter speed, or when you have to sacrifice shutter speed for depth-of-field. I've even used it to get fairly sharp candids of people in nightclubs and cafés while hand-holding the camera at $\frac{1}{4}$ second! Of course, you may have to make more than one attempt to get a really steady shot, but that's much better than not being able to get the picture. Besides, remember that a bad digital photo costs absolutely nothing unless you print it or keep it. So there's never any harm in trying.

Burst mode

Quite a few cameras will let you take rapid sequences of shots. You achieve several great benefits by being able to do this. First, it's a great way to make little animations (such as a walking man or a girl winking) for the Web. Simply choose the smallest size image that the camera can shoot, save each shot for the Web in GIF format, and then use a Web image-editing program (such as Adobe ImageReady or Macromedia Fireworks) to display each image as a frame in an animation.

Burst mode is also very handy if you have a camera that doesn't have a Best-Shot Selector feature. The difference between using the burst mode and the Best-Shot Selector is that the camera doesn't throw out all but the sharpest shot — you do. In fact, you even gain an advantage by doing it this way: The best shot isn't always the sharpest shot. In fact, shooting a sequence is a great thing to do when you're *trying* to shoot a blurry shot. Then you're more likely to get just the right amount of blur at just the right time.

Finally, burst mode is often the way to go when you're shooting sports or other events in which things happen so fast that it's nearly impossible to anticipate the "peak moment." You just set your camera for burst mode (this usually works best at high shutter speed) and press the shutter button an instant or two before the peak action happens. If you choose a smaller-than-maximum image size, you'll be able to shoot more frames per second, which helps to ensure that you catch the peak moment. You may not be able to make as large a print, but you can show the whole sequence side-by-side or as a rapidly changing slide show in a presentation or on the Web.

Time lapse mode

If your camera has a time-lapse mode, you'll be able to take pictures with long intervals between shots. Of course, you'll be able to choose the intervals. You can then show how something progressed or evolved over time—including how the light and weather changed in a given situation. After you have made the images, you can put them into a slide show, print them as a series of prints, or place them as frames in a movie by using video-editing software or a Web animation program.

If you're going to make time-lapse sequences, remember these pointers:

✦ Make sure your camera is protected from thieves, the weather, and passing traffic.

✦ Mount it on a very steady tripod. You will rarely want the camera to move between frames.

✦ Be sure you're plugged into an AC power supply. Batteries won't last if the camera has to stay turned on for hours at a time.

Note   Don't let anyone mislead you into believing that your still digital camera is a good substitute for a video camera. The difference in both resolution and quality between the lowest-price DV camcorder (very good) and the highest-priced still camera with a "video" mode (barely passable) is like night and day! You can make some very nice little movies, but there's no way you're going to be able to record sixty minutes worth of video—at least no *practical* way.

If it is important to you to be able to make short movies with your digital camera, look for a camera that will save its movies in QuickTime format, which will ensure that most people will be able to view the images on the Web.

Special panorama settings

All digital cameras (in fact, all cameras) will let you take pictures that can be used to make a computer-stitched panorama. However, some cameras (most notably Canon's) have a special panorama-shooting mode that lets you see the portion of the previous frame that should overlap the current frame. You can then visually rotate your camera so that you can precisely overlap sequential frames—even if you're hand-holding the camera. The result is very precise stitching.

Settings that lock the exposure, focus, and zoom ratio so that they don't change as you shoot the frames that make up the panorama are more prevalent than the overlap feature mentioned previously. Although locking the settings between shots is not as cleverly inventive as the overlap feature, locking the settings can be even more valuable in ensuring a successful panorama. Nothing will ensure the success of precision frame overlapping as well as a pan-head made especially for taking panoramas, such as those made by Kaidan.

Cross-Reference You'll find an entire section on how to make panoramas in Chapter 16.

ISO rating

The ISO (International Standards Organization) rating is a measure of the light sensitivity of an image-recording device. For old timers in photography, this is the same rating we used to call the ASA (American Standards Association) rating. The ISO rating is equivalent to the shutter speed at f16 that would produce a "normal" exposure of an average scene in bright sunlight. So every time the ISO rating increases or decreases by a factor of 2, the required exposure is one full f-stop greater or smaller.

Most digital cameras will either adjust their ISO sensitivity automatically or let you choose full stop increments between ISO 50 (same as very fine-grained 35mm film) and ISO 800. The most typical range of choices is between ISO 100 and 400. Professional 35mm cameras will even let you go all the way up to ISO 3200 or even 6400 — a sensitivity high enough to allow for shooting at very high shutter speeds for stopping sports action or at normal speeds in very dim lighting conditions (think street lamp lit, back alleys and the bars in nightclubs).

Noise reduction, ISO settings, and long exposures

If you need to boost the ISO rating in order to get the picture, then that's what you need to do, but there is a drawback to doing so. As is the case with film, each time you boost the ISO rating the image gets grainer. Film grain occurs as sensitivity goes up because the light-sensitive grains of silver are more light sensitive when they are larger. In digital images, the grain gets larger because turning up the sensitivity means "turning up the volume" by increasing the electrical signal that passes through the sensors, which causes more information to be shared between sensors, so the "dots" appear to get bigger and some are somewhat discolored.

A few digicams (mostly more recent and closer-to-$1,000 models) feature one or more noise reduction modes. You can use several methods to reduce noise to your image after it's been shot; using these methods will give you more control. On the other hand, it's nice to have the image look as good as possible when you send the images straight from the camera to your client or to a Web site for the general public to ponder.

An interesting sidelight to this is that some of the newest and highest resolution (4-5 megapixels at this writing) consumer digicams force you to use a smaller image size if you turn on noise reduction, thus causing you to lose some of the advantage you would have expected to gain. So if your primary purpose in taking the picture is to get it onto the Web or a proof sheet as quickly as possible, use the noise reduction mode. If your primary purpose is to use the photo for print and it needs to be as high quality as possible, shoot at the higher-resolution larger image size and then use the instructions in Chapter 16 to achieve the noise reduction. If you have to accomplish both goals — and you have the time and presence of mind — shoot one picture for each purpose.

Another cause of grain and noise is using long exposures to capture scenic night scenes. Because these exposures tend to be far longer than anyone could hope to hand-hold, the camera is generally going to be mounted on a tripod.

Saturation controls

Digital cameras tend to be over-sensitive to some colors (mostly bright reds and deep purples). On the other hand, when the lighting is very flat — especially if atmospheric haze is also present — colors tend to go gray and dull.

The more advanced digital cameras have a built-in cure for both of these problems. It's called *saturation control,* and it gives you some control over the intensity of colors. So the next time you have to shoot on a foggy day, turn on your camera's saturation control and crank the saturation up. Conversely, next time you shoot a close-up of a poinsettia, lower the saturation.

Contrast control

The same cameras that feature saturation control generally feature *contrast control*. Contrast control can also make colors seem more intense, but what you are really doing is making the difference between brightness levels more distinct.

Contrast control is a lifesaver when you have to shoot scenes that simply have more levels of brightness than you could ordinarily hope to record. It's also a godsend when you are trying to capture texture or create the impression of sharpness in a subject of very limited tonal range.

Of course, you can control brightness and saturation after you've taken the picture using your image-editing software. However, controlling contrast and saturation after the picture has been taken doesn't give you more flexibility in the range of tones that you can capture — only in what you can do with them after you've captured them.

Utilizing Camera Features

In addition to the settings and modes that you can use to control the image that your digital camera produces, you can also benefit from hardware design of various of your camera's components. Everything from ergonomic considerations to the type of battery that you choose can have an impact on how your camera functions and how you use it.

Overcoming parallax

The word *parallax* sounds intimidating, but it's simply the difference between what your camera's optical viewfinder sees and what the film sensor sees, as shown in Figure 2-6. In other words, it's the difference between the framing you see and the framing you get. The closer the camera is to the subject, the greater the difference in how the subject is positioned in relationship to the edges of the picture. Another problem that's so closely associated with parallax that most just consider it to be a part of the same problem is the difference in frame size between viewfinder and final image.

Figure 2-6: An image as seen through an optical viewfinder (left) and as recorded on film (right)

One way to overcome parallax is just to move the camera up and to the left in order to place the lens more or less exactly where the shutter button was when you clicked.

The best way to compensate for parallax, however, is to eliminate it. To do so, simply use a camera with a through-the-lens viewfinder. Almost all digital cameras have that capability because you can use the camera's LCD monitor, but here's a better way: Use a single-lens reflex (SLR) camera. The difference between what you see on an LCD and what you see through an SLR viewfinder is that LCD monitors are usually hard to read when the outside lighting is much brighter than average indoor

room lighting. Some cameras are much better in this respect than others, but the only way you'll find out is by making a live comparison in broad daylight or by reading reviews on the Net or in camera magazines. Also, the resolution of an LCD is generally not high enough for critical focusing and often only shows about 85 percent of what the camera sees (as opposed to an SLR's typical 95 percent).

Some camera's LCD monitors let you preview your shot, no matter what the relation of the position of the camera to the position of your eyes. These cameras have viewfinders that swivel and tilt so that you can shoot behind you, shoot self-portraits, see the image when you have to stand at a distance from the camera and shoot by remote control, or shoot from angles that are at a level that is practically impossible to view from eye level. The good news is that most SLR cameras let you preview through the LCD as well and some of them even swivel. The most versatile swiveling LCD monitors work like the one shown in Figure 2-7.

Figure 2-7: The swiveling viewfinder on the Nikon Coolpix 5000

You can also overcome the difficulty of seeing the LCD in bright light by using an LCD hood like the one shown in Figure 2-8.

Some digital SLRs have viewfinders that are small LCDs behind an optical lens that magnifies the LCD. Although this arrangement overcomes parallax, these viewfinders are typically of such low resolution that you have to depend entirely on your camera's auto-focusing mechanism for accurate focus. The advantage of this arrangement is that the camera manufacturer can claim that the camera is an SLR while considerably cutting costs and pricing.

A true SLR is entirely optical. The image is projected from the primary lens onto a mirror or prism that directs the image onto the viewfinder's virtually grainless ground glass. You can see a startling difference between the image clarity and color on an optical SLR and on a LCD SLR. Figure 2-9 shows the difference between the two types of SLR viewfinders.

Figure 2-8: A Hoodman LCD hood

Figure 2-9: A simulation of how the same subject looks when seen on an optical SLR and and LCD SLR

Choosing a sensor

The light-sensitive mechanism (image sensor) in a digital camera is a solid-state device that's manufactured in much the same way as your computer's processor or memory chips.

When it comes to image sensors, bigger is better for the following reasons:

✦ The light sensitive area of the image sensor chip is closer to the size of conventional film, so there won't be such a disparity between the actual focal length of the lens and its equivalent analog camera focal length.

✦ There's room for more light-sensing units, so resolution is potentially higher.

✦ Light-sensing units are farther apart, so there's less likelihood of *blooming*. Blooming is the bleeding of colors that can occur when adjacent pixels sense and record a color that should have been limited to its neighbor. Blooming is one of the most significant differences one sees in image quality between images recorded by professional and semiprofessional cameras.

The two types of image capture devices commonly used by digital cameras are the charge coupled device (CCD) and the complementary metal oxide semiconductor (CMOS). The more common of these is CCD, which has been around for some time — it was invented as an image sensor for video cameras more than a decade ago. The one advantage that CCD chips currently offer that can't be outweighed yet is manufacturing quality. Manufacturers have simply had more experience with this type of chip when it comes to their ability to capture images and have become really proficient at making them.

CCDs offer other advantages, as well. For one, they're tiny, so they can be placed in tiny cameras. However, because bigger is better, its size is also a disadvantage. CCDs tend to be highly sensitive to low light, although sensitivity seems to go down as image quality goes up, so still-camera CCDs tend to be far less light-sensitive than their video camera cousins. CDDs also respond smoothly to varying light levels.

On the downside, CCDs crowd pixels too closely together. They also use way too much power when compared to their CMOS competitors. Additionally, CCDs can't be used to store programming instructions, unlike CMOS.

CMOS, the newer technology, has some great potential advantages. The first professional (or even semi-professional) level SLR camera to use a CMOS chip, the Canon D30, has received considerable critical praise. CMOS appears to have great potential for the future. This CMOS potential over current CCD sensors in the same price range and level of cameras includes a larger light-sensitive area with less pixel crowding, lower cost of manufacture (eventually), and a higher level of integration with other chip functions so that features can be programmed onto the sensor chip. Also, fewer support chips are needed, which may lower the overall cost of making the camera.

CMOS chips also tend to be larger for a given resolution than CCD chips. Therefore, it's likely that the first sensors to be the same size as a 35mm frame will be CMOS chips. This will make it possible to buy an interchangeable lens, 35mm-style, professional SLR digital camera that can actually use the same collection of lenses that the photographer uses on his traditional 35mm camera at the same equivalent focal length.

If you must choose between the two technologies, compare the CCD picture with a picture of the same subject taken with a highly respected CMOS-equipped camera of the same resolution. If you don't have the opportunity to do the testing yourself, check out the computer and digital photography magazines that review the latest equipment.

Ergonomics

Look for a camera that feels like part of your body when you hold it. When you wrap your right hand around it, you should feel confident that the camera won't drop from your hand, no matter how active you have to be when taking the picture. Your index finger should just naturally fall on the shutter release. The zoom controls should be right by your thumb, which should also easily reach the various mode and menu buttons on the back of the camera.

The basic modes (Auto, Program, Shutter Priority, Aperture Priority, and Manual) should be immediately available by turning a clearly-marked dial at the top of the camera. The purpose of all other controls should be clearly labeled in English. If they are labeled with cryptic icons, they may be hard to understand or remember and send you chasing after the manual each time you need to make a special-purpose setting. This labeling issue is illustrated in Figure 2-10.

Figure 2-10: Which controls are easiest to understand? (C-3020 versus Coolpix 5000)

Camera size can be very important. If you're a professional, you probably want a camera that's big enough to impress the art director and rugged enough to withstand a trip through the Australian outback. If you want to be sure your camera is always handy, compactness is of critical importance. Even if you need portability over in-your-face ruggedness, look for durability. Perfect examples of small but rugged cameras that will fit in a shirt pocket are the Canon S300 and the Pentax Optio 430.

Make sure that it's easy to connect external accessories (especially third-party external flash units) and that the input for external power doesn't get in the way of being able to hold the camera comfortably. (This is the same place where you connect an external battery pack.) Finally, it should be fairly obvious how and where to connect the USB cable (something only the cheapest cameras should be able to get away without), the microphone (if the camera makes videos with sound), and the video output.

Digital Film Type

The type of digital film that your camera uses can be very important, especially if you're serious enough about your pursuit of digital photography to expect to keep up with the state-of-the-art by upgrading your camera as new models come out. For that reason, you may want to look at which cameras use which type of digital film and then choose the digital film type that seems to be used on the most popular brands of cameras. Then, as the theory goes, you will stand a better chance of being able to make use of your investment in memory cards when you change cameras. It's not unusual to collect half a dozen memory cards over time, which is not an insignificant investment. Also, if you work in an organization that utilizes several (or many) digital cameras, it can be helpful to stick with one memory card format that can be shared among users.

Frankly, that's tough advice to follow. At the time of this writing, new memory card types and products that use them pop up on an almost weekly basis. In order of popularity, the most common types of flash memory digital film cards are: Compact Flash, Smart Media, Memory Stick, Multimedia Memory, and removable disk (standard floppy, super-floppy, or miniature compact disc). To help you make up your mind, each of these types — along with their major advantages — is described in the following sections.

Compact Flash

Compact Flash cards are available in two types: Type I and Type II. Type II cards look the same as the Type I card externally, but they are a bit thicker and the slots for them can accommodate the IBM Microdrive and some higher capacity flash memory cards. At the time of this writing, the maximum capacity of either is 1GB, but that's triple what it was a year ago.

By a slight margin, Compact Flash is also the most widely used type of digital film. It can also be used in Handspring PDAs and quite a few MP3 players. The reason for the popularity of this format is its ruggedness, comparatively low cost, size (small, but not so small as to be too easy to lose), and versatility.

Smart Media

Smart Media is about 1.5 times as tall as Compact Flash, but only half as thick as a dime. The thinness means that you can pack three or four of them in the same space as a single Compact Flash card. The popularity of these cards runs a very close second to that of Compact Flash cards. While some swear by the durability of these cards, their circuitry is printed on the unprotected surface of the card.

Memory Stick

Memory Sticks are a Sony invention. The card is about the size and thickness of a small stick of chewing gum and was designed for use in a variety of electronic devices. Although they certainly work well in cameras, their main advantage is their small size, which makes them ideal for use in small wireless devices, such as cell phones, digital voice recorders, PDAs, and game machines. By introducing a small proprietary format that is ideal for its top-selling wireless and PDA devices, Sony offers an advantage to customers who also want to buy Sony's digital cameras and camcorders: One device can be used in all equipment. The strategy seems to be working. Memory Sticks have already become the third most popular flash memory card format, falling barely behind Smart Media. Ask yourself this question: Do I want to be married to one manufacturer's products just because I've invested in their memory cards? Also, am I willing to pay more per megabyte of memory?

Multimedia memory

This is the latest thing, and probably the best format for ultra-small cameras, such as pen cams and "spy" cams, because the media is only about the size of a thick postage stamp. Yet it currently holds up to 64MB of memory or about 22 to 40 low-compression 5MB JPEG image files. Like the Memory Stick, this memory format was designed more for miniature wireless devices such as cell phones, PDAs, walkabout game consoles, media players, and digital video cameras that also capture stills. Currently, this format is just establishing itself.

Removable disk

One of the most popular memory formats is one of the oldest and most common-place: the floppy disk. Sony's Digital Mavica range of digital cameras was designed around this format and their cameras that use it are still among the most popular digital cameras. I suppose that people feel comfortable with the storage media and seem to like the idea that they can send their pictures right along with a letter to home without having to worry about whether the cameras will be able to hook up to a computer right away. Besides, most people have a few hundred 3.5-inch floppies that they want to find a use for.

This format, however, also has some serious problems: You're lucky if you can store more than two or three compressed 2 megapixel images, yet for what you have to pay for the camera, you could get a much more versatile and high resolution unit of up to 3.4 megapixels. Also, it takes forever to write each image to the floppy, and the higher the image resolution, the longer the wait. Finally, floppies are anything but reliable when it comes to archival qualities. One day the data is there and the next you simply can't read the disk.

Sony has a new removable media camera that takes 3 megapixel images and writes them to 3-inch CD-R (write-once recordable) discs. You can put several hundred images on one of these CDs and it's easy to transfer the images to your computer by reading them from any standard CD-ROM drive. The camera costs as much as

some 5 megapixel semi-pro cameras, but there's a 2 megapixel model that sells for about $300 less and it will record even more images on the 3-inch CD. Aside from price, the biggest drawback to these cameras is that they're relatively large and heavy. After all, they have to make room for an on-board 3-inch CD-R drive.

Start-up time

One of the most important (and most often overlooked) camera features to look for is fast start-up time. A few cameras, such as the Olympus E-20, the Minolta Dimage X, and the Canon S-200 and S-300 start up within two or three seconds of being switched on. Many others don't start up until the opportunity to take the photo has long since passed.

How fast you need your camera to start up depends largely on the nature of the subject matter that you prefer. If you're a reporter or if you want to catch important family moments as they happen, start-up time can be critical. If landscapes and still-lifes are your specialty, you may prioritize lens, viewfinder, and image quality over start-up time.

Battery type

You should consider several things when choosing a camera in regard to the type of batteries that it uses. These considerations include whether replacement batteries can be found and whether you can use an external battery pack.

Replacement batteries

In terms of availability, you're best off if your camera uses standard AA batteries. If you can use AAs, you can buy replacements virtually anywhere. Buy NiMH rather than NiCads — they do less damage to the environment and have no memory loss problems, so they last longer. Rechargeable batteries are clearly marked as to whether they're alkaline, NiCad, or NiMH.

It is, unfortunately, becoming more fashionable to use camcorder-type proprietary batteries. The good thing about these is that they are a little larger and may have marginally more lifespan before recharging. The bad thing is that they are an excuse for the manufacturer to make more money because you're forced to buy batteries from them at roughly four times the price of AA-style batteries. Now, ask yourself: Am I better off being able to afford four times as many batteries so that I can put in fresh ones when I need them, or to have a battery that costs four times as much and lasts only about 20 percent longer than four AA's?

Some manufacturers (Olympus is a good case-in-point) are clever enough to make a proprietary battery that will fit into the same space as AA batteries or very long-life, single-use lithium batteries. This is a superbly intelligent way to design a battery compartment.

Chargers

If a charger isn't included in the price of the camera, you're going to have to pay (approximately) between $14 and $50 for one. If it's not compact enough so that you can easily take it with you, you will definitely find yourself out on a trip or at your daughter's wedding and totally unable to take any more pictures. By the way, the newest chargers will recharge the batteries in an hour or less and are intelligent enough to automatically turn off when the batteries are fully charged. If one of these doesn't come with your camera, get one. Of course, you've always thought to bring along lots of fully charged spare batteries.

Battery life

Even if you have lots of spares, you don't want to find yourself running out of juice just when the picture taking gets exciting. The higher the MAH (milliamp hours) rating of the batteries the longer the batteries will last. (1600 is considered a very good rating for AAs, but some are now rated at as much as 1800.) How long they'll last in terms of the number of shots you can take or how many hours they'll last in your particular camera depends partly on your camera, but mostly on how you use it. If you constantly zoom, use flash, and keep the LCD viewfinder on, and always review your pictures right after you've shot them, buy an external battery pack. Otherwise, your batteries are bound to die just when you're ready to take the world's greatest shot.

External battery packs

You can buy external battery packs that are rechargeable and small enough to fit in your shirt pocket or to clip onto a belt for only about $50 (the same price as some of the proprietary in-camera batteries). They're indispensable if you're shooting extensively at an event or on-location because they have enough capacity to let you shoot several hundred 5 megapixel shots without having to change batteries. They're also small enough and affordable enough to just keep in your camera bag for those occasions when you suddenly realize that someone "borrowed" your AA batteries or that you forgot to charge them overnight.

These battery packs generally come with adapters for virtually all AC input plugs — just make sure your camera has provision for using external power (it's the same plug that's used for an AC adapter). So if there isn't an AC adapter plug, there won't be any way to use an AC adapter when you're shooting indoors for still-lifes, portraiture, or document copying.

External flash connections

Two types of connectors are commonly used to connect external flash to your camera: PC connector and hot shoe, each of which is shown in Figure 2-11. Both proprietary and generic versions of each are available. Figure 2-12 shows a proprietary PC connection. In either case, they add very little to the overall cost of the camera and

give you access to a very useful source of lighting. In fact, for several types of shooting situations, external flash is all but indispensable. Be sure that the camera you buy has one of them.

Figure 2-11: At the left is a generic PC connection, at the right a generic hot shoe connection

Figure 2-12: Proprietary PC connection

Hot shoe connections are more versatile than PC connections because they will work with both proprietary and generic flash units. On first use, they may seem less versatile because the flash must be a hot shoe flash and it must be connected directly to the camera. However, adapters can be readily purchased that provide a generic PC connection as well as a generic hot shoe connection. This allows you to use any type of external flash unit. However, the circuitry in some generic external flashes can short the internal connections in your camera.

Solution

One hot shoe adapter that seems to work well for all cameras is the Wein safe synch adapter. At $50, it's a bit pricey, but it contains a circuit that protects against short-circuiting from more powerful flash units. It is especially advisable to use a Wein safe synch if you are connecting to studio strobes.

Transferring Photos from Camera to Computer

Professional digital cameras communicate to their host computer via very fast connections — either SCSI or FireWire. As a result, you can download images directly from the camera as quickly or more quickly than if you were to use an external card reader. In fact, professional studio cameras are usually hooked to the computer full-time because the computer is their only means of storing an image. If you take one of those cameras into the field, you simply take along a fast laptop with a large hard drive. Professional field cameras generally use PCMCIA cards for storage, many of which are internal hard drives. You can read the images from those cameras by putting them into the PCMCIA slot in a computer (usually a laptop) or download them directly via a FireWire or SCSI connection. Download times are comparable in either case.

Lower-priced cameras are a different story. All semi-professional digital cameras and all point-and-shoots (with the exception of the Sony Mavica series, which use floppy disks, and digital video cameras, which use FireWire) come with a cable that tethers the camera to a computer via a USB port. In most instances, the software that comes with the camera can be used to control the camera, to change its settings via menus, and to transfer the images from the camera's storage medium to the computer. The image transfer process typically takes half an hour. If you have high-capacity media, it can take what seems like a lifetime.

Devices for reading images

If you own a digital camera and plan to make much use of it, invest in an external card reader. Three types of external card readers are available: floppy disk adapters, card readers, and PCMCIA adapters. Floppy disk adapters are an option

only for cameras that use SmartMedia digital film. Cameras that use CompactFlash, Memory Stick, or SD cards will have to use card readers or PCMCIA adapters. Card readers are available that fit into one of your computer's disk drive bays, and although they are the fastest card readers, they cost more and can't be moved from computer to computer. PCMCIA card readers come in formats for all types of memory cards. You slip the memory card into one end of the adapter and the adapter then fits into a PCMCIA card slot. If you plan to transfer your images to a laptop, PCMCIA adapters are the handiest and fastest way to go.

Floppy disk adapters for SmartMedia

Floppy disk adapters operate at the transfer speed of a floppy disk, but they can hold several megabytes of data (however many your SmartMedia card holds). So it can take a few minutes to transfer all the files to your hard drive. This is a fraction of the time it takes to transfer files from the camera via serial cable, but several times longer than it takes to transfer files from a USB-connected card reader.

If your camera uses SmartMedia cards, you can buy a floppy disk adapter that will fit into almost every computer on the planet, other than those with external parallel port drives or with Imation SuperDisk Drive drives. Of course, your computer has to have a floppy disk drive in order to accept a floppy disk adapter.

To use a floppy disk adapter, you must have your images stored on SmartMedia because CompactFlash is too thick to fit inside an adapter that's the size and shape of a floppy disk. You push the SmartMedia card into a slot in the side of something that can easily be mistaken for an ordinary floppy disk. You must have driver software installed on the computer that uses the adapter, but you can put the driver software on a floppy disk. Then this device makes it possible to read your digital camera files much faster on any computer.

Floppy disk adapters don't transfer files quite as quickly as a card adapter, but are much faster than through a serial cable. To use them, you simply slip your SmartMedia card into something that looks like a 3.5-inch floppy. You then insert that into your floppy drive and your operating system recognizes the disk and its contents — just as if it were a real floppy. The difference is that SmartMedia cards can hold up to 256MB of information (at the time of this writing), versus 1.4MB for a double-density floppy. So one of these adapters and a SmartMedia card could make a great way to transfer downloaded programs and documents to your laptop without having to go out and buy an external Zip drive or having to burn a CD.

Floppy disk adapters are actually somewhat less portable than you may think, however. First, you need to check the list of incompatible devices to make sure that the host computer will be friendly. Second, you have to carry around different versions of the driver for Macs and PCs. Finally, they are battery-powered. If the batteries die, you can't read your files. Keep a spare set on hand. They use very thin watch batteries.

Card readers

Card readers are devices that enable you to insert the camera's memory media into a slot in a device that acts as a removable-media disk drive. They are available for all types of digital camera memory cards. Card readers come in versions that can be attached to the computer internally or externally via SCSI, parallel port, USB port, or PCMCIA card slot.

Card readers look like a mouse with a mouth, the mouth being the slot into which you place the memory card, as shown in Figure 3-13. Card readers cost between $25 and $75, depending mostly on how many different card types the adapter can read. The type of connection to the computer also plays a role: Firewire models cost a bit more than USB models. Most manufacturers offer models of card readers that read both SmartMedia and CompactFlash. Recently there have been some models introduced that read all four different form factors. If you buy a new adapter that reads Compact Flash, make sure that it can also read Compact Flash II, which can accommodate the new high-capacity Micro Drives from IBM.

Multiple format card readers are great if you have a field staff (realtors, insurance adjusters, or people who contribute to your company newsletter, for instance) equipped with cameras from various manufacturers. Also, if you decide later to buy a different make of camera, there's a better chance that you won't also have to buy a different kind of card reader.

Internal units that attach to your computer's hard disk controller are generally the fastest drives, but they can take up space and resources that you may prefer to devote to a CD recorder or removable-media drive (or both). Internal readers also cost significantly more. Of course, internal card readers aren't portable at all.

Camera Transfer Software

Every digital camera I've reviewed or used comes with software that lets you transfer images from your camera. Windows XP has a built-in capability to transfer images from most cameras and scanners without forcing you to use your camera's software. Many image-editing software packages also have this ability built in. So look around. Chances are you already have the software means to transfer images directly from any USB-equipped camera. However, there's good reason to examine what the image transfer software you use will do because it is definitely more efficient to combine image transfer with image management and at least some basic image editing for color-correction, exposure correction, and red-eye removal.

Connections for transferring images

An earlier section in this chapter pointed out the advantages and disadvantages of using various devices for reading images. This section focuses on how to use those same devices.

PCMCIA adapters

PCMCIA (the term has been popularly shortened to *PC card*) adapters are available for all the types of flash memory cards currently in vogue for use as digital film. If your computer has an internal PCMCIA slot (found on almost all portables), this is the fastest way to transfer your image files to a computer. However, keep in mind that unless you buy a PCMCIA internal slot for your desktop computer, you may have to spend extra time transferring the images from your laptop to a removable-media drive and then to your desktop computer. Or, you may have to transfer them via a LAN (local area network).

Put your camera's flash memory card into a PCMCIA adapter. Then slide the PCM-CIA adapter into a PCMCIA slot on your laptop, and the flash memory card is immediately recognized as a standard drive. You can then rename the files if you like, or simply select them and drag them into a folder on your hard drive — time elapsed: somewhere between a few seconds and a couple of minutes. A PCMCIA adapter (shown below) will fit directly into any standard Type 1 or 2 slot on either a Mac or Windows laptop computer.

Using the parallel port

You can find card readers for all the types of camera memory (including PCMCIA cards) that will attach to the parallel port of a Windows computer. These are not an option for Mac users. The good thing about parallel port connections is that they are as common to Wintel PCs as floppy disk drives. In other words, you can pretty much count on being able to find a computer that you can download to in any corner of the world. The bad thing is that they are slow and comparatively bulky (parallel connectors are a couple of inches wide and they use thick, stiff cables).

The cable connections for a parallel port drive also connect to a PS/2 keyboard port. Both cables have pass-through so that you can connect a printer and/or external removable-media drive to the parallel port, and an external keyboard, mouse, or digitizing tablet to the keyboard port.

Using a USB 1.1 port

USB stands for Universal Serial Bus — a magical new invention from Intel that originally was intended to be competition for Apple's FireWire. USB 1.1 can transfer data at 12 megabytes per second (Mbps), and you can attach as many as 127 devices to a single port (most computers and adapters provide two ports). You can also plug in and unplug devices while the computer is running. After you've installed the driver for a device, the computer will recognize automatically when it's plugged in and will know to deactivate the device when it's unplugged.

It didn't take long for Apple and Intel to figure out that these two new serial protocols — USB and FireWire — complemented, rather than competed with, each other. USB is much faster than standard serial connections, and it is also compact (the

connections are a fraction of the size of standard serial connectors) and affordable. In fact, adding USB and FireWire to new motherboards does little to affect the price of the motherboard. Nearly all current-generation computers are being supplied with USB ports, regardless of platform.

Even if you don't have the latest-generation computer, you can buy a USB card for any PCI bus machine for around $40. You can use the same card for Macs (at least those models that support the use of PCI expansion cards) or PCs, so this is a piece of gear that you can hang onto if you want to switch platforms or expand your computer system—even if you're moving up to a computer that has built-in USB. If your computer runs Windows, you'll want to upgrade to Windows 98, Me, or XP for USB support. If you must stick to Windows 95 or NT, you will need a computer with the latest OEM (original equipment manufacturer) extensions to the operating system. Check with the manufacturer of your computer to see if this is the case. USB cables and connectors aren't much bulkier than modular phone cables, so it's quite easy to pack one of these units into your camera bag.

Finally, adding USB ports to your computer can pay off in other ways. It's an ideal connection for all sorts of peripherals, such as spare floppy drives, mice, keyboards, monitors, and modems. Best of all, you don't have to worry about device or IRQ conflicts, nor do you have to worry about having too many devices on your standard serial, parallel, or SCSI ports. The prevalent buzz is that USB ports will eventually replace all conventional serial and parallel ports.

USB 2.0

The most recent version of USB is USB 2.0, which transfers data at 480 Mbps. That's 80 Mbps faster than Firewire (see the next section "Using a FireWire port"). However, USB 2.0 devices are just now coming online and older operating systems may not support the standard directly. To find out the latest status of USB 2.0, check with manufacturers of USB adapters such as Keyspan and with the USB-IF (www.usb.org), the USB standards organization.

Solution

If you don't have a USB card installed in your computer yet, you can buy a PCI-based adapter that will work in many late-model PCs and Macs. Because the standard is backwards-compatible, you can use current USB devices and will be ready for the super-high speed devices as they become more and more available. PCI cards are selling for around $70 and PC cards are currently selling for around $100, but these prices will surely come down as the standard gains in popularity.

Using a FireWire port

FireWire is one of several names used for a very fast serial interface that was originally invented by Apple Computer as a way to transfer digital video files to a computer's hard drive in real time. Since then, it has been rapidly adapted for use by such data-transfer intensive devices as CD-RW and DVD-R drives, professional level still cameras (including most SLRs) and a few card readers.

Note FireWire connections can also expand your creative horizons: If you happen to interested in digital video as well as digital photography, FireWire is the de facto standard connection for real-time data transfer from a DV camcorder.

FireWire is very similar to USB. The most significant differences are as follows:

✦ FireWire is up to 400Mbps faster than USB.

✦ FireWire costs slightly more than USB.

✦ FireWire is marginally less common than USB, but it is now commonly installed on late model Macs, virtually all Sony PCs and laptops, and on many higher-performance Windows computers.

✦ USB doesn't support the hardware control that FireWire does. For example, you can't control your digital camera or DV camcorder with a software application through a USB connection.

FireWire is only one of the names by which this interface protocol is known. Others are IEEE 1394, I-Link, and Lynx. FireWire is best suited to digital video and other ultra-high-volume transfer operations. On the other hand, if you have it or can afford it, it's also by far the quickest way to transfer images from camera to computer. Many professional digital still cameras, particularly studio cameras, are counting on it because it can transfer very high-resolution files virtually instantly. This greatly reduces the time needed between shots.

Solution If you have a staff of people turning in photos on a variety of cards, the speed of transfer provided by FireWire card readers is a godsend. If you use high-capacity (320MB or more) Compact Flash or Microdrive cards and a Firewire card reader, you can work around the fact that your camera may not have a Firewire connection.

FireWire cables and connectors are nearly as small and convenient as their USB counterparts. However, adding FireWire adds to the cost of the system. At the time of this writing, you can add FireWire for a fairly nominal amount (about $100), and the cost keeps dropping.

FireWire, like USB, became officially supported in Windows as of Windows 98. All more recent versions of the operating system (Me, XP) will support FireWire.

FireWire is also plug and play, like USB. You can connect as many as 63 devices, and as many as 17 of the connected devices can be daisy-chained. *Hot-plugging,* which is the ability to plug in and unplug devices while the computer is running with automatic device recognition, is also supported.

Solution If your cards tend to have hundreds of files stored on them, as would likely be the case with a 1GB CompactFlash or IBM Microdrive card, look for a card reader that connects through a Firewire port.

Using a serial port

Virtually all cameras made before 2001 will attach to either a Mac or a PC only through a standard serial port. It works, if you have patience. However, it typically takes half an hour to download an 8MB memory card. Remember that some of the newest cards are 64MB and even 96MB capacities. Imagine how long that takes to download one of those through a serial port!

If a serial port is the only way your camera connects to your computer for transferring images, buy a USB, USB 2, or Firewire (in reverse order of speed and cost) card reader. USB 2 is backwards compatible with USB 1.1 devices, so upgrading now will prepare you for the future. Serial connectors were popular in last year's models because only serial ports were widely available on both PCs and Macs. When they're built into the camera, however, image transfers tend to be painfully slow via serial ports. Currently, the availability of USB and FireWire is universal (although, if you have an older computer, you may have to buy a PCI-slot adapter card.)

Note   PC and Mac serial ports are not compatible, and the same cable will not work on both systems. However, adapters are available that convert Mac serial to PC serial or vice-versa.

Summary

This chapter explains the purpose of each of the most prominent hardware features of today's digital cameras. Each of these features also presents some solutions to commonly encountered digital photography problems and those are described as well. I also outlined which camera features can be especially helpful, the purpose of the various shooting modes, how to overcome parallax, how to make sure you find a camera with high-quality optics, and the value of good camera ergonomics. I also talked about how to find the best value and performance in batteries and digital film. This was all followed by an in-depth discussion of hardware that makes it possible to move the pictures from your camera to your computer as quickly as possible.

✦   ✦   ✦

Think Before You Shoot

This chapter covers the essential habits and considerations that contribute to the creation of consistently good pictures. Although many of the rules described in this chapter apply to any type of photography, these descriptions are modified slightly to take into consideration the "gotchas" in making digital photographs. By my definition, a good picture is one that conveys the emotions you felt at the instant you took it. You might think of this chapter as a book of rules, but if you do, realize that the most exciting pictures are those that have broken the rules. This is because, sometimes, by breaking the rules you create a fresh point of view. On the other hand, if you don't first learn to follow the rules, you are almost guaranteed to produce an unacceptably (in your eyes) high percentage of unpresentable pix.

Exposing for Highlights

Digital cameras, especially those priced under $2,000, tend to overexpose highlights and bright reds. As a result, these areas have no detail or texture. If there are important bright areas in your subject, reduce your exposure value by one f-stop (EV -1). Most of the time, you can do this even when the camera doesn't offer any exposure control. Simply point the center of the image at the very lightest part of the subject (use spot metering if it's an option on your camera) and press the shutter button until you feel a slight resistance (or, as they say in most of the camera manuals, "halfway"). This locks the exposure reading so that you can move the camera to frame your subject as you desire. Press the shutter button all the way down and the shutter clicks to actually take the picture. Even underexposing by a full EV is preferable to burned-out highlights — especially with the knowledge that your image-editing software can recover a great deal of detail in the shadow areas.

> **Tip**
>
> When you're exposing for highlights, shoot at the highest-quality compression set-ting that your camera allows. This is important because when you use your image-editing software to compensate for underexposed shadows, there is a tendency to exaggerate the *noise* (random flecks of bright colors) that collects in the shadows. The more highly compressed the image, the more objectionable the noise in the shadows is likely to be.

Of course, you have much more control over this situation if your camera provides some means of manual exposure control. Most of the cameras over $500 (and even some lower-priced ones) will let you change the exposure value. To expose for the highlights, set the camera at EV –1. Then, when your camera manually calculates the exposure, it will automatically underexpose by one f-stop.

More advanced (and usually more expensive) digital cameras actually let you set the shutter speed and f-stop (aperture) independently. Usually, such cameras will display the currently chosen settings. So, you just reduce the meter reading by one f-stop to make the shutter speed twice as fast. F-stop apertures are smaller when their designated number (f8, f11, f16, and so on) is higher, just as shutter speeds are faster when the number is higher (because they represent a fraction of a second).

Blooming

Blooming is what happens when adjacent image sensor cells pick up the light that is actually focused on a neighbor. Blooming occurs to a much greater degree in pho-tographs taken on less expensive cameras and is especially a problem in very bright highlights and colors from red to purple. Because of blooming, light-colored fabrics and the petals of flowers in the red to purple range can lose much of the detail that gives them texture and depth.

If you own a professional camera, you probably won't have much of a problem with blooming. If your camera cost less than $300, I can almost guarantee you that blooming will be a noticeable problem. Higher priced cameras vary in how much blooming occurs, although they are improving as new models are introduced and image sensors are made larger because the cells are less crowded. However, just because a camera exhibits some blooming when used for shots of very bright highlights or pinks and fuchsias shouldn't entirely disqualify it. The camera may do very well in many other respects.

Cutting your exposure slightly can solve the problem of blooming. If you have lots of reds — especially very bright and light shades — drop your exposure by about one half stop (EV –0.5). Your picture may seem too dark on preview, but you'll be able to fix most of that in your image-editing program. Digital image sensors seem to be much better at capturing detail at lower light levels (up to a point) than at very bright light levels.

Cameras with CMOS image sensors are reputed to have the lowest incidence of blooming. The first two professional cameras to appear with CMOS sensors are the Canon D-30 and, very recently, the Canon D-60. Both of these models have been getting rave reviews regarding their lack of blooming and noise and may be a precursor of things to come. The D-60, which sells for around $2,000 (with no lens), is the first professional camera to drop within the price range of prosumer cameras and the first to offer resolution at or near that of popular 35mm film emulsions.

White balance

Different ambient light sources have different colors (or, more scientifically, color temperatures). That's why slide film comes in daylight (outdoor) and tungsten (indoor) flavors. Color temperatures are measured in degrees Kelvin. The color temperature of your average household bulb is around 3,200 degrees Kelvin. The average color of daylight varies considerably depending on the distance of the sun from the horizon, whether the sun is rising or setting, and what the influence of clouds and atmospheric gases may be at the time. However, the mean temperature of daylight ranges between 5,000 and 5,400 degrees Kelvin.

On the surface, white balance isn't much of a problem. Most digital cameras have an automatic white balance mode that most digital cameras utilize by default. Even if the values set by the automatic white balance are inappropriate for the current situation, you can generally use an image editor to correct the settings. The one reason to dwell on the topic of white balance is that digital camera sensors are designed to get optimum results when the color temperature of the prevailing light is around 5,000 degrees Kelvin. You're best off putting a color correcting filter in front of the lens — that is, if you don't mind taking the time and spending the money. This action is called *analog white balancing*.

Most digital cameras automatically compensate for the color temperature of the ambient light, though they vary considerably in their ability to "guess." Some cameras measure the actual light coming through the lens and — better yet — some will let you take a white balance reading through a milky-white plastic lens cap. This is a feature that is especially common on video cameras.

For creative purposes, it helps to have a camera that lets you deliberately set the white balance to match the color temperature of a specific type of prevailing light. If you have such a camera, you will be able to make it intentionally record a daylight scene that is "too warm" by setting the color balance for tungsten light or too green by setting the color balance for fluorescent light. Daylight and flash are essentially the same color temperature, although flash is often slightly bluer.

Shooting a picture at the wrong color balance isn't nearly the problem for digital images as it is for film. This is because you can easily compensate for color balance

in your image-processing program. However, you will lose some image definition (data) in the process. This loss of data is only noticeable in extreme cases or when you also do considerable exposure compensation. Just remember the garbage in/garbage out rule: The cleaner the image you start with, the cleaner the image you end up with.

To perform analog white balancing, you will need to purchase at least an 81A tungsten filter to correct for indoor light. Check your camera manual for the filter size if your lens has screw-in threads or buy your camera manufacturer's recommended filter adapter and a filter that's the right size for the adapter. It's not critical that you correct for all the variations in indoor lighting, since the differences are small enough that you can easily do these in your image processing software without creating excess noise.

Long exposures

Your film doesn't care how long you have to leave the shutter open in order to collect enough light to get visible detail in your image. If you have to shoot that black cat in a coal bin at midnight — no problem. Just dose the cat with sleeping pills so that it won't move for an hour or so and put the camera on a good, solid tripod.

However, attempting to use same technique with a digital camera — especially one that costs less than several thousand bucks — will most likely result in nothing but Jackson Pollock-like specks of color against a brownish-black field. Digital engineers call this *pure noise,* which occurs because digital image sensors don't like making exposures much longer than half a second. If getting the picture is more important than getting the picture quality, you can get away with an exposure of a few seconds, which should get you a pretty decent shot of the Las Vegas Boulevard at night, for example. After a few seconds, it's all downhill, and you may want to fall back on your film camera.

The Rules of Good Lighting

Photography is nothing without light. In fact, strictly speaking, a photograph is nothing more than a record of the way that the ambient light reflects off the surfaces that are framed by the camera's viewfinder. The sooner that you learn what to expect from the way light behaves and how to make the best of it, the better photographer you can become.

Use natural lighting whenever possible

Granted, you will encounter plenty of occasions when using the prevailing natural light just isn't possible. However, all other things being equal, natural lighting is almost

always preferable to artificial lighting. Why? Well, because it looks believable—we're used to seeing things that way. You can shoot in natural light, crop the subject so closely that you can barely identify the surroundings, and still make a pretty good guess as to the subject's general surroundings. You know instinctively whether the photo was taken in direct sunlight at midday, outdoors in the shade, indoors by lamplight, or in a neon-lit nightclub.

The worst kind of unnatural lighting that you can use is the built-in flash unit. However, if you must choose between using the built-in flash and missing an important picture, use the flash. If your camera won't let you shoot a long enough exposure, operate at a wide enough lens aperture, or boost the ISO rating of the image sensor, then you're probably not going to be able to shoot candids indoors or at night without a flash or some other type of supplementary artificial light. Motionless or nearly motionless subjects usually won't pose a problem—as long as your camera is advanced enough to let you make long exposures, and as long as you have a tripod or some other means of keeping the camera steady while the shutter is open.

If you're going to shoot candids in dim available light, it's a good idea to use an external incident light meter. This is a helpful tool in these circumstances because you'll almost always be shooting in high contrast lighting conditions, in which only the light falling directly on your subject is important. An external incident light meter enables you to measure the brightness of the actual prevailing (ambient) light and to determine exactly what your shutter speed and aperture combination should be. If you don't have access to an external incident light meter, the next best thing is a camera with spot metering, which allows you to read from the area of greatest importance to you (such as the highlights on faces).

Use reflectors and fill flash in bright sun

If you have to shoot close-ups in bright sunlight, you may want to consider balancing the harsh lighting contrast by supplementing the light directed into the shadows. Nearly all digital cameras with a built-in flash let you choose a fill-flash mode, which is an easy way to solve the problem, as shown in Figure 3-1. However, not all cameras are equal in their ability to balance the fill flash with the brighter light. Some (usually less expensive) cameras just fire the flash without adjusting its duration. This may work if the sunlight is really bright or if you're more than six feet away from your subject. Otherwise, the fill light is likely to be brighter than the sunlight. The only way to know for sure is by testing or reading reviews of the particular camera you're using. Also, most digicams priced over $500 will actually adjust the duration of the flash in relationship to the brightness of the prevailing light.

Tip   If your tests indicate that the flash tends to be too bright in relationship to the sunlight, tape a few layers of facial tissue or tracing paper over the flash; this action diffuses the flash so that it doesn't create harsh countershadows, as shown in Figure 3-2. It's also a good technique for extreme close-ups because the amount of light from the flash is reduced.

Figure 3-1: The model was shot in direct sunlight without built-in flash fill (left) and with built-in flash fill (right).

Figure 3-2: Taping tissue over the built-in flash diffuses the light and also reduces the amount of light used for fill or close-up flash.

Use the shade or a cloudy day

You may be able to control extreme contrasts in lighting by simply moving your subject out of the glare of a direct main light, such as the sun. If you want detail in your shadow areas, take your pictures when it's overcast or hazy. If the subject is small and moveable or if you are photographing people and you can control the location, then use a shaded area—preferably one in which light is reflected off a nearby building so that you're not overpowered by toplight. Of course, if you are shooting candids or news photos, you may not have this control over the lighting.

Keep the light off your lens

If the main light source (whether this is the sun, a flash, or a flood light) is aimed directly at your lens, you'll get something called *lens flare*, as shown in Figure 3-3. Lens flare is the reflection of light on each of the elements of your lens. As a result, the exact effect varies from camera to camera and from lens to lens.

Figure 3-3: An example of ugly lens flare

Most of the time, lens flare is a highly undesirable effect because it hides the sub-
ject. The solution to this problem is to shade the lens in such a way that shadow is
cast over the lens without showing up in the picture. An even smarter solution is to
use a lens shade that is made for your favorite lens. You can buy a lens shade with a
thread diameter as large as the largest thread diameter that you're likely to need
and then use a step-up adapter for smaller diameter lenses, but then the shade may
be too big to be effective when the sun's angle from the lens narrows. In other
words, the lens shade won't be effective over as wide a range of circumstances.

Essentially, you really need to buy a lens shade that covers the widest range of cir-
cumstances for each lens as possible. The lens shades that I find most useful are
rubber and can be extended. The optimal solution is a rubber lens hood that can
extend to several depths. When the lens is zoomed to a wide-angle, the shade can
be pulled back; when the lens is zoomed out to telephoto, you pull the shade out
until it's deeper. In some cases, there is also a middle setting for telephoto. Such a
lens shade is shown in Figure 3-4.

Figure 3-4: An adjustable focal length rubber lens shade

I can almost guarantee you, however, that you'll forget your lens shade just when
you need it most. As long as you have the ability to preview through the lens by
using either your LCD monitor or an SLR camera, there's an easy cure: Use your
hand as a shade. You'll be able to see the lens flare in your SLR viewfinder or LCD
viewfinder. Just hold the hand that's not holding the camera in front of the lens and
move it around until the flare is gone. Then quickly check to make sure no part of
your hand is still in the frame.

Use hard light for drama

Hard and contrasty lighting (a situation that often occurs in direct, midday sun-
light) tends to hide too much detail in the shadows. However, this type of lighting
is effective in certain circumstances because the shadows can become a strong
element in the composition and dark shadows tend to make a picture feel more
dramatic — or melodramatic.

The level of drama tends to increase with the angle of light. Moreover, the angle of the light tends to dictate the mood of the drama. If the light comes from below, the mood is menacing. If it comes from the side, you see strength and masculinity in male subjects, as shown in Figure 3-5; and pensiveness or mystery in female subjects.
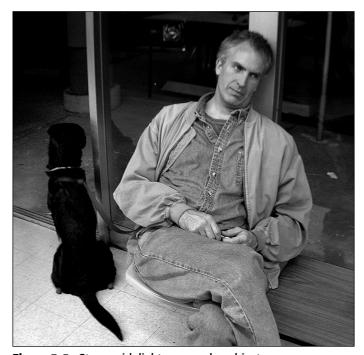

Figure 3-5: Strong sidelight on a male subject

Hard light is usually best for male subjects or in landscapes and still-life photography when you especially want to dramatize the detail in highlights. Figure 3-6 shows an example of how texture can be enhanced by using hard light.

If you want a hard light effect, use one or a combination of the following techniques:

✦ Use very little (or no) fill light or reflectors

✦ Use direct lighting and avoid backlighting

✦ Use an undiffused light source, such as lightboxes, and avoid soft reflectors, such as umbrellas. (Lightboxes and umbrellas are used for soft, diffuse lighting with soft-edges and open shadows.)

Cross-Reference   For more on different types of reflectors, see Chapter 5.

Figure 3-6: You can really feel the texture in this wood grain, thanks to contrasty lighting.

Use soft light for most situations

The most all-purpose type of lighting is soft, diffuse lighting. The versatility of this lighting is due to the fact that it allows for detail in both the shadows and highlights and that more of the range of brightness in the subject can be recorded on the image sensor.

However, soft lighting varies. Outdoors, for example, truly soft and diffuse lighting usually occurs on very cloudy days and even more so if there's fog or smoke in the air. If you're shooting portraits or close-up details, you'll find even more opportunities for shooting in soft light by moving into the shade. If you do so, you should look for what is known as *open shade,* which is shade that is open on the side facing the subject — or on the side that you face the subject toward. The opposite of open shade is *closed* (or *enclosed*) *shade,* which forces all the light to come from above, thus creating dark holes for eyes. (See Figure 3-7.)
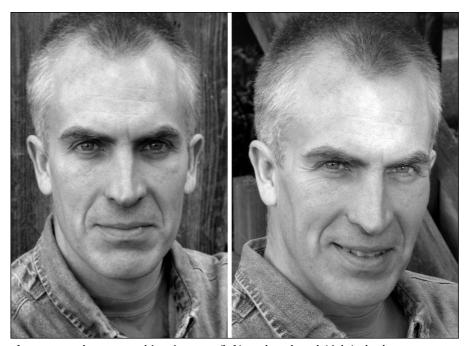
Figure 3-7: The same subject in open (left) and enclosed (right) shade.

Indoors or in the studio, you can create soft lighting by using either reflected or diffused light — or a combination of the two. The softest (least directional) light is reflected (or *bounced*) light. Reflected light is achieved by aiming the main light source at anything bright enough to bounce the light back in the direction of the subject as well as in practically all other directions. Most professionals control the direction of bounced light with an umbrella reflector, which scatters the light in many directions. Figure 3-8 shows a portrait taken with the light reflected from a single umbrella.

Reflected light is often used in situations where the photographer needs to take pictures with a portable flash. The flash is external and is fired at a ceiling or wall so that the light is softer, and comes from an angle that reveals the shapes in the subject and creates a more natural-looking atmosphere. You can also use various attachments to the flash to bounce or diffuse the flash if there is no reflective wall or ceiling available.

Figure 3-8: The result of using an umbrella can be seen in this portrait.

Use backlight to highlight the subject

Backlighting is lighting that's aimed toward the camera. Backlighting is useful for separating the subject (especially if it's a close-up, such as a portrait or still-life) from its background. In Figure 3-9, you can see how this has been effective in two examples.

As lovely as backlighting can be, it does have potential negative effects; for example, you can get lens flare due to the fact that the backlight is aimed toward the lens. You can avoid the lens flare by using a lens shade or otherwise blocking the light from hitting the surface of the camera lens.

Backlighting can be also be so bright that it throws the side of your subject facing the camera into shadow. You'll almost always want to balance backlight with enough foreground light to fill the shadows. This is the best use for the built-in flash in your camera—as fill flash for outdoor lighting. You can also fill the foreground with light from a reflector, such as a white foamcore mounting board or a silvered car windshield reflector.

Figure 3-9: Two examples of how backlighting separates the subject from its background

In the studio, photographers usually create backlighting by placing a small, low-powered, focused light behind the subject, as shown in Figure 3-10. This light is usually lower-powered than the main light, so filling to compensate for the brightness of the backlight is unnecessary. Also, the potential for lens flare is minimized by shading the backlight, usually called a *hair light,* by using a *snoot,* which is a long black tube that fits around the light's reflector.

Use sunrise, sunset, and clouds

If you're shooting outdoors, you're almost always better off if you do it in the hours closer to sunrise and sunset. The light tends to be both softer and at an angle that is more flattering to the subject.

You're almost always more likely to take a successful outdoor picture if there are clouds in the sky. For one thing, it just makes the sky more interesting and adds atmosphere to the photo. For another, you're more likely to get softer lighting on the landscape, and the shadows aren't so deep.

Figure 3-10: The bright rim of light in the hair was accomplished by backlighting with a hair light.

Focusing Techniques

Understanding a little bit about focusing techniques can allow you to control the image that you create. Among other things, you can learn to control which part of the subject attracts the most interest and how to sharpen or blur the foreground and background.

Depth-of-field

Depth-of-field is the range between the nearest and farthest subjects that appear to be in sharp focus. Figure 3-11 shows an example of extended depth-of-field.

Digital cameras almost always give you too much depth-of-field — a characteristic that they share with video cameras. That is because the CCD image sensors used in these cameras are typically $\frac{1}{4}$ to $\frac{2}{3}$ the size of a 35mm still frame. So, a digital camera lens that is the equivalent of a given 35mm camera's focal length has to actually be $\frac{1}{4}$ to $\frac{2}{3}$ the size of the real focal length of the equivalent lens. In other words, a 50mm "normal" lens on a 35mm camera would be only a 35mm lens on a prosumer-level digital camera — or a 25mm lens on a digital camera with less than 4 megapixel resolution.

Figure 3-11: Nearly everything from foreground
to background is in focus.

Now, here's the problem: The shorter the actual focal length of a lens, the greater
the depth-of-field. Sometimes, especially when shooting extreme close-ups, the rela-
tively extreme depth-of-field offered by a digital camera is an advantage.

More often, extreme depth-of-field is a drag. All of the distracting elements such as
phone wires and flowered wallpaper are just sharp enough to make the viewer's
eyes wander away from the main subject.

What can you do about the too-much-depth-of-field problem? Well, if worse comes to
worst, you can always use your image editor to isolate your main subject and blur
everything else, as shown in Figure 3-12. However, this isn't quite as easy as it sounds.
In order to keep the out-of-focus areas looking natural, you'll have to blur closer objects
first and less, and then select the areas that are farther away and blur them more.
Feather your selections so that the differing degrees of focus deficit blend together.

Here's what you can do to avoid having to resort to your image editor:

✦ Shoot from an angle that places your subject against as plain a background as
  possible.

✦ Use a slow shutter speed and have your subject move parallel to the lens
  while you pan. The subject will stay sharp and the background will streak.

✦ Shoot in strong backlight and expose for the shaded side of the subject.

Figure 3-12: The background in this figure was blurred in an image-editing program.

Autofocus

Almost every digital camera can focus automatically. Many also provide for manual and continuous autofocus. Under most circumstances, autofocus is the best option because it improves your chances of getting the correct focus in the least amount of time. In other words, you're more likely to get that shot that you didn't foresee wanting to take until almost the minute it happened. Many situations that you want to capture may arise suddenly, such as your kid deciding to take that leap off the diving board, the lady stepping into the street without looking and nearly getting hit by a passing bus, or a deer suddenly walking into a patch of tree-filtered sunlight.

The primary consideration when using autofocus is the position of the subject. Most autofocus cameras automatically focus on whatever is at the dead center of the frame, and you rarely want your subject in the center of the photo. The following steps outline a technique that you can use to work around this problem, and the effect of this technique is illustrated in Figure 13-13:

1. Aim the camera so that the spot you want to be most sharply focused is smack in the middle of the viewfinder or LCD.

2. Press the shutter halfway. You should feel a slight resistance, and you will usually hear the lens move as the camera autofocuses.

3. When the image is in sharp focus, *do not* release pressure on the shutter release button. This is called *locking focus* (exposure is usually locked at this point as well). Swing the camera to frame the picture as you prefer, *then* continue pressing the shutter button until it hits bottom. You'll hear a click or see a light flash to let you know that the picture has been taken.

Figure 3-13: The position of the subject when locking focus and when the picture is taken

Continuous autofocus

Continuous autofocus is a feature found only on some digital cameras; although this feature is not necessarily tied to price point, it's also not generally found on the least expensive models. The purpose of continuous autofocus is to accurately track the distance of moving subjects from the lens; it's great for sports, action, and wildlife (both human and animal). The following steps outline how continuous autofocus works:

1. Select the continuous autofocus option on your camera. The process for doing this varies, so you'll have to look in your camera's manual. Usually, you choose it from a menu on your LCD preview monitor.

2. Aim the camera so that the subject on which you want to maintain focus is dead center. Then depress the shutter button halfway. Because you've set the camera in continuous autofocus mode, the camera now automatically focuses on the subject no matter where it moves.

3. Fully depress the shutter button when the moment that you want to take the picture arrives.

Manual focus

If you've had enough practice and the camera controls are easy enough for you to access, full manual control of focus is hard to beat — especially if you're using a conventional (not LCD) SLR and have good eyesight and quick reflexes. Then you can always place the focus exactly where you want it to be — which is sometimes

not where the camera may expect it to be. For example, suppose that one person in the picture is handing another person a very special gift and you want the focus to be on the gift and not on the person giving or receiving it, or perhaps you want the focus on the flying football and not on the receiver.

A more common reason for wanting to employ manual focus is when you're shooting through or past a foreground object to the object of your photograph, which is further away. In autofocus mode, the foreground objects are those likely to be sharp while the object you really want to see is either fuzzy or really fuzzy. This situation is illustrated in Figure 3-14.

Figure 3-14: Attempting to autofocus through a chain link fence

Most SLR cameras let you manually focus in the same way as on a conventional camera: You turn a switch to manual focus mode and then twist the focus ring on the lens. However, the lenses on smaller digicams may be so small that ring focusing is either impractical or there just isn't room for a ring. With these cameras, you usually have to pick a specific focusing distance from an LCD menu. If you want to focus on something like the object mentioned in the previous example, you may have to measure its distance manually or at least make an accurate guess. If the latter is the case, use a smaller aperture (higher f-stop number) and slower shutter speed to increase depth-of-field.

Capture or Eliminate Motion

A consideration that you'll often have to make when taking a picture is whether to freeze all motion (including camera jiggle caused by your nervous excitement). Sometimes you'll want to keep the cyclist sharp and blur the background. On the other hand, when he breaks the ribbon at the finish line, you'll probably want to freeze everything in that moment. The choice is yours.

Freeze the subject and blur the background

If you want to create the impression that your subject is moving very rapidly and if the subject is moving primarily in one direction parallel to your camera (think of a cyclist or Indy car versus a hurdle-jumper), you may want to shoot at a moderately slow shutter speed while you pan (swing the camera) to keep the subject in the same relative position within the frame. You can do this while hand-holding the camera, but it takes practice to keep the camera from moving vertically while you're panning horizontally. In most cases, it is best to use a tripod with a panning head. You can use the following steps to capture motion in your image:

1. Place the camera in shutter-priority mode and set the shutter speed at $\frac{1}{60}$th second (make it even less if the subject isn't moving all that rapidly). The camera will then set the aperture automatically.

2. Make sure that the subject is always in the same position within the frame. I usually use the focusing/metering mark in the center of the viewfinder to track a particular point on the subject.

3. Place the camera in autofocus mode or continuous focus mode, which is better if you have it.

4. Be sure that you're focused on the subject.

5. Take several shots as the subject moves past the camera from one side to the other. If your camera has a rapid sequence mode, use it. Taking several shots is good insurance that you'll get at least one shot where the subject is sharp and the background is blurred. See Figure 3-15 for an example of a series of shots.

Figure 3-15: Several shots of the subject in motion

Use high shutter speed to freeze everything

Most of the time, you won't want anything to be blurry on account of motion, whether the motion comes from your shaky hands or the subject's sudden and unpredictable movement.

Unless you're cold or have very shaky hands, it's a pretty safe bet that a shutter speed of $\frac{1}{125}$th of a second will keep the picture reasonably steady, as long as you're not taking a telephoto (more than approximately 85mm focal length equivalent). Double that if you're using more than 150mm focal length equivalent and double it again for each additional 100mm that the focal length increases.

> **Note**   The focal length of digital camera lenses (or zoom settings) is usually expressed as the equivalent focal length needed to get the same angle of view on a 35mm camera.

If you really have to freeze fast action, such as in most sports photography, use the highest possible shutter speed. The following steps provide an easy way to accomplish this:

1. Set your camera in shutter priority mode.

2. Set the shutter speed at or above $\frac{1}{1000}$th second. The aperture setting will be taken care of automatically.

3. Check to make sure that a red light isn't blinking at you to indicate that you're going to under-expose the picture. If you are in danger of under-exposure, drop the shutter speed one full stop. Continue slowing down the shutter speed until you stop getting alarm signals (these vary from camera to camera; check your manual to be sure).

Use low shutter speed to blur everything

Sometimes, a really blurry picture just works magic and creates excitement. I've seen this technique work to imply the hustle-bustle of movement in a big city at rush hour, the frenzy of nightlife, or just the uncontrollable nature of the situation. A good example of this is shown in Figure 3-16.

Forcing motion-blurring is easy:

1. Use the shutter priority mode.

2. Set the camera's shutter speed low enough that the camera can set exposure accurately at the lower three to four f-stops of your camera's aperture range. A shutter speed of $\frac{1}{8}$th second is a good place to start, but experiment to see that this is the case before you start taking pictures for real. You can delete the test shots (unless you accidentally came up with a winner, of course).

Figure 3-16: The intentional motion-blurring implies excitement at this party.

The Rules of Good Composition

No matter how good the digital camera is, digital photographers can benefit from an awareness of the guidelines for making good photographs. Awareness of the rules that tend to lead to good composition is the best place to start because these rules are applicable regardless of the location or conditions in which the photograph is shot.

Composition, in case you're not familiar with the term, refers to the arrangement of the various objects in the picture in relationship to one another. Even when these objects are immobile, you can affect their arrangement in the image by changing your point of view. Also, the highlight and shadow areas of the picture, especially if they are prominent, can contribute as much to the composition as the positioning of objects themselves.

These rules are made to be broken

The first rule of good composition is that there really are no rules. This is because following certain rules too closely can result in visual clichés that may cause a

viewer to lose interest. Cliché composition tends to make viewers feel that they've "been there and done that." This is especially true if a particular composition of a particular subject has become an icon, such as Ansel Adams' classic study of Yosemite's Half Dome. Take another picture of Half Dome from the same POV (point of view) and the viewer's likely first thought is, "Not as good as Ansel Adams' shot." It probably doesn't even matter that the vegetation, weather, and mood are entirely different. To put it another way, the first rule of good composition is: Try to find a fresh point of view.

Now that I've drummed that into your head, you can start to appreciate the other rules with some perspective.

The two-thirds rule

The *two-thirds rule* is one of the oldest and most tried-and-true compositional guidelines. It's also called the *rule of thirds*. The idea is to draw an imaginary 3 x 3 grid across your picture. Any point where the grid lines intersect is a point where the eye naturally tends to find a center of interest. The intersections that are two-thirds from one edge of the picture are the points of greatest interest — thus the two-thirds appellation. Figure 3-17 shows this grid at its points of primary interest.
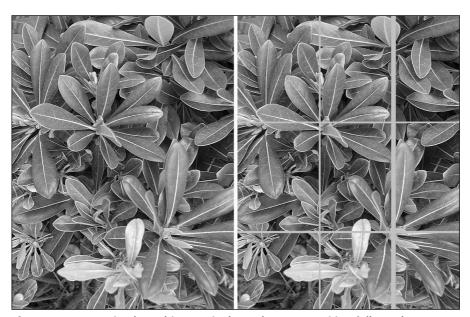
Figure 3-17: Amazing how this seemingly random composition follows the rule of thirds.

In the real world, you'll find it nearly impossible to strictly place the center of inter-est at one of these points. Fortunately, "somewhere in the vicinity" is close enough. Also, virtually any placement of the center of interest that is closer to one of the two-thirds lines is more desirable than placing it too close to the center or too close to one of the edges. Placing the center of interest too close to the center of the pic-ture tends to make it a boring composition. Placing the center of interest too close to the edge tends to lead our eyes completely out of the picture, rather than draw-ing them in.

Of course, this rule has exceptions. For example, when you're trying to picture power and intractability, placing the subject dead center makes us feel that there's no way around it.

The shapes of a composition

You may not even know that compositions have shapes. Strictly speaking, maybe they don't. But compositions in which the eye is led in a circle, along an S-curve, about the perimeter of a triangle, up or down a C-curve, or down a V all tend to work in particular ways:

- ✦ **The S-curve:** S-curves gently lead our eye into the picture. S-curve composi-tions are generally soothing, pass multiple points of interest, and also have a way of denoting femininity.

- ✦ **The Triangle:** A triangle is the strongest geometric shape. Use triangular com-positions to denote strength.

- ✦ **The C-curve:** A C-curve is useful for framing the subject or gently leading our eye into the picture.

- ✦ **The V-shape:** A V-shape tends to emphasize perspective and to pull you from one of the edges of the picture to its center of interest.

Seldom is there only one center of interest in a photograph. Different points of interest can form the path of a compositional shape. This helps to ensure that the viewer's eye will travel from one point of interest to another. Shapes also tend to carry emotional messages.

For example, the shape of a circle imprisons our eyes and forces our eyes toward the center of the circle. Circles are also liberating, in that they can take us away from the rectangular boundary common to almost all photographs.

The most common use of circular composition is the *vignette.* You can make a vignette by fading the image out from the center until is framed in a circle of light-ness or darkness. Usually, the vignette fades to complete white or black, but it can be much more subtle and still be effective. Figure 3-18 shows a traditional vignette surrounding a traditional portrait.

Figure 3-18: A vignette forms a circle to hold the focus of attention on this portrait.

Framing the Subject

The main thing that distinguishes a color photograph from real life is that it is seen in a square frame, rather than as a panorama with no definitely defined edges. Along with composition, what we put into that frame makes the difference between a picture and a great picture. The following sections discuss some considerations to make when framing the subject.

Don't include anything unimportant

This concept is best summed up with the phrase "move in close." Force the viewer to concentrate on the thing that you want to show. This advice goes for panoramic landscapes as well as for macrophotographs of bugs. In other words, you may want the viewer to see something that includes a lot of territory. Nevertheless, you want to be sure that the frame doesn't include so much that your audience misses the point.

Keep the background simple

Unless clutter is the point of the picture, such as a portrait of your great aunt's attic, avoid it. *Clutter,* by my definition, is anything that distracts from the subject. Unless ugliness is the point of the picture, clutter is anything unattractive: telephone lines, litter, and so forth.

The following are the three best techniques for keeping the background simple:

✦ Place your subject against an area of relatively unadorned space, such as a wall or a distant (and preferably out of focus) landscape.

✦ Throw the background out of focus. If you're shooting with a prosumer or consumer-level digital camera, you may have to resort to blurring the background in your image editor.

✦ Blur the background with motion. To do that, pick a background that's in motion or put your subject in motion and use a long enough exposure that the background is truly blurred. It will take some practice to get this technique down. Fortunately, with digital film, all you lose is time.

The exceptions to this rule are those occasions when the background itself is a strong contributor to the picture's message. Maybe it is all the "stuff" that enriches the subject of the portrait. Maybe it's just the texture of the atmosphere. If the background is important, you want to do everything possible to keep it razor sharp, which you can do by using a tripod and a small aperture.

Use lighting contrasts to strengthen composition

Strong lighting contrast is often undesirable, as discussed previously in the section on lighting. However, in those instances where it is desirable, you capitalize on that fact by using it to strengthen your composition and the compositional shapes. Don't be afraid to use light to lead the eye.

Leave space in front of motion

If you are shooting action, especially if speed (as opposed to climax) is the point, leave lead space in front of the subject. Remembering the rule of two-thirds, keep the fast-moving subject headed into the empty two-thirds of the frame.

Use perspective

Place your main subject between objects that are large and close to the camera and others that are small and far away. Alternatively, find converging lines that give the viewer a feeling of space and depth. This gives the viewer the feeling of being there — of being surrounded by real space.

Account for shutter lag

If your pictures depend on timing, be sure that you are using a professional or pro-sumer-level camera with 3 megapixel resolution or higher. This is not an absolute requirement, but most less-expensive and earlier-generation digicams exhibit a marked delay between the time the shutter trigger is fully depressed and the time the exposure is actually made.

If you have such a camera, you can do something about it: practice, practice, prac-tice. Practice anticipating the peak of a motion or expression. For example, suppose that you're shooting a baseball game and you need to capture the instant before the ball actually strikes the first baseman's glove. You will have to learn to shoot an instant after the ball leaves the second baseman's hand. Furthermore, you'll have to get good at picking just the right instant.

If you frequently shoot similar situations, such as a model breaking into a smile, try videotaping such moments. Then play back the repeat moment over and over while you practice firing your camera. You'll get a good sense of when you have to shoot to anticipate that peak of action or expression. In fact, you'll be amazed at how much your timing will improve as a result of such practice — even when you don't have to worry about shutter lag.

Tip   When you are faced with anticipating shutter lag in order to get the peak of the action, start counting aloud at the instant you press the shutter button. After a while, you'll get a good idea of how many "beats" must pass before the shutter fires. A bit more practice and you'll figure out how far ahead of time you need to press the shutter in order to have the shutter "click" at the desired moment.

By the way, because many digital cameras don't have actual shutters (the image sensor just activates for the required fraction of a second), there's no shutter click. Look for a camera that gives you some audio cue as to when the picture-taking instant occurs. Many digital cameras will give you a little beep. Several Kodak mod-els actually simulate a shutter click — a great idea. Unless all your digital photos will be of static subjects while your camera is mounted on a tripod, don't even think about buying a camera that doesn't give you some sort of audio signal at the firing of the "shutter."

Summary

This chapter was all about forming the right habits and routines so that you can take good photos. In particular, I focused on getting into habits that keep you pre-pared, learning good lighting and focusing techniques, and understanding the rules of good composition. I also discussed how to keep the subject in motion and how to frame the subject.

✦   ✦   ✦

The Shoot and the Equipment

Part II contains four chapters that discuss how to prepare for different types of shooting situations. I advise you on what to take with you when you have to shoot on location, whether you are going to be on the road or down the block. I also explain how to set up a workable studio for digital photography, with a special focus on some indoor lighting equipment that's uniquely affordable for digital photographers without compromising functionality. The section concludes with how to equip your computer specifically for digital image editing.

On Location

In photographer's vernacular, when you take your camera
away from home and the studio, you're shooting *on loca-
tion*. In this chapter, I address the most typical on-location
types of shoots, whether they are photo-projects or assign-
ments. Each type of shoot is described in a self-contained
section so that you can refer to it before you leave home.
Every shoot requires some standard equipment, but each
section has a checklist of additional accessories that you
will need on that particular type of shoot.

The Essential On-Location Equipment

You should never be without some specific items when shoot-
ing on location — especially if you're driving to get there. If
you're driving to the location, you can keep tripods and reflec-
tors in the trunk. As long as they're in the car, they're at least
relatively accessible. If you're traveling, take along a backpack
that's made for digital photography and can hold all of the
essential equipment. On days when you don't need it, you can
leave the backpack in your hotel and take along a smaller bag.

The following list is meant to be comprehensive. You won't
need everything all the time, but this is a good checklist:

✦ Camera safety items:

• Neck straps

• Lens shades

• UV filter

✦ Camera bag or backpack

✦ Extra memory cards

✦ Extra batteries or a battery pack

✦ Filter set

✦ Any supplementary lenses that you own

✦ Tripod or monopod

✦ Table-top tripod

✦ LCD shade

✦ Off-camera flash

✦ Battery recharger and (if necessary) cord

When one of these accessories is especially important to a particular type of location shoot, the reason for its importance is discussed in the following sections.

> **Cross-Reference**
>
> Neither this list nor the rest of this chapter is meant to be a complete reference for your accessories. If you want descriptions, details, suggestions for use, and recommended manufacturers for each of these items, check out Chapter 6, which covers accessories for both outdoor and indoor shoots in detail and presents the major strong and weak points of alternative choices.

Portraits

Pictures of people and animals are by far the most popular category of photography. Most of us put the subject in front of the scenery so we can save film and prove that we've been there. Be aware, however, that combining the subject with the Louvre or Mt. Rushmore is usually a bad idea because it confuses the viewer as to what the center of interest should be.

Using a camera's built-in flash is very useful for filling shadows in strong backlighting or high-contrast settings, as shown in Figure 4-1. On the other hand, if it's the only light source (which is true more often that not), it's the least flattering light source you can find.

> **Cross-Reference**
>
> Chapter 5 provides more information on portrait lighting.

The subject's position and expression

The subject of most people's pictures is other people. After all, that's who we mostly like hanging out with. Here are some ideas on how to improve on your pictures of people.

Figure 4-1: Fill flash in bright sunlight

Get to know your subject

The more you know about your subject, the easier it is to interact with that subject. You have a better chance of knowing what makes your subject smile, frown, and otherwise communicate his or her passions. Those passions will be obvious to the viewer of the photos, so they're important. Models will often bring along a bio — be sure to ask them for it. Most professional business people have a bio as well. If you're shooting with a stranger and you have time to interview them before the shoot, do so. If you know your subject's background and interests, you are likely to have insights, which can inspire more expressive poses. Your primary interview question should be: What's really important in your life? Be sure you're ready to shoot while you're conducting the interview. Some of the subject's most sincere expressions will come out naturally during the course of the interview. Some expressions can come off as funny faces, but don't be concerned with accidental bad shots — they can be easily erased and cost nothing. The bad shots just increase your chances of getting the exceptionally good shots.

Make the subject act

Whether or not you know your subject well, it's a very good idea to ask them to pretend to be in situations that will bring out the character you want to portray. Ask them to flirt with the camera (not with you — that can be threatening or impolite), take command of the imaginary audience, think about a sad or nostalgic moment, or imagine winning something or getting a great gift. You can get different results by asking these questions repeatedly in different surroundings, at different times of the day, and in different lighting situations.

Change locations and clothing often

You'll keep your model more interested and engaged if you don't insist on maintaining the same pose, lighting, or surroundings for more than a dozen shots or so. The exact number of shots in one setting or position depends on how fast you shoot and on how expressively versatile your model is.

Don't let your subject square their shoulders

Unless your subject is a wrestler, weight-lifter, or in the military, you don't want their shoulders parallel to the lower edge of the picture frame. Have the shoulders turned so that one is closer to the camera than the other. This makes an angled line that leads the viewer's eyes to the subject's face as demonstrated in Figure 4-2. After all, the purpose of a portrait is usually to concentrate the viewer's eyes on the subject's face.

Figure 4-2: The subject has her shoulders squared in the portrait on the left.

Keep the subject's chin down

Unless you want the subject to look as though they're about to dominate you, it's a good idea to keep the chin down. The subject's eyes are larger because they're closer to the camera. The face becomes longer and thinner (most women love that one).

Lighting

In general, I recommend that you use soft light for women and babies and stronger light for male subjects, as in Figure 4-3. Lighting sources that don't create sharp-edged shadows generally create a more feminine mood. They also soften skin tones and discoloration and tend to minimize wrinkles and skin problems. On the other hand, if you want the macho, rugged look, go for more direct sunlight and a non-diffused flash. Not only is the character of the lighting more rugged, but you'll also pick up more texture and contrast in clothing and hair. If you do use bright hard-edged lighting (especially side-angled sun), it's usually a good idea to fill the shadows with your built-in flash.
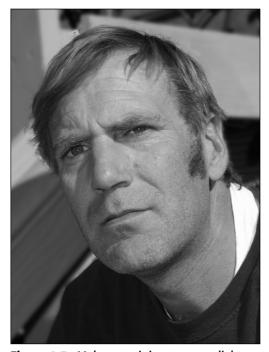
Figure 4-3: Male portrait in strong sunlight

Keep the background plain

Generally, if you are shooting anything other than a character or culture portrait, the less you see of anything but the subject, the better. I love to use backgrounds like nearly blank walls that have just enough patina and character to set a mood, but not enough to draw attention from the subject.

If you don't have a flat background handy or if you want some of the surroundings to give character to your subject, the easiest way to keep the viewer's attention centered on your subject is to throw the background out of focus. How far out of focus you make the background depends on your purpose for taking the picture. Obviously, if you're shooting swimsuit fashion in the tropics, you want the surroundings to contribute to the mood and the message. On the other hand, if the surroundings are just unavoidable, use as large an aperture (lowest-numbered f-stop) as possible so that the background will be as much out of focus as possible.

This is another arena in which the digital darkroom can be a big help. Information presented in Chapters 11 and 12 will help you find ways to digitally blur or totally remove the surrounding background. Keep in mind, however, that such digital tricks can reduce the credibility of the image and they take time to create. In other words, don't place all your bets on fixing something digitally that you wouldn't have to fix if you had followed proper procedures in the first place.

> **Note**   In order to ensure the shallowest possible depth-of-field, use your camera's Aperture Priority mode. Aperture Priority mode allows you to set your camera's aperture to a fixed setting. Using the widest aperture, which is the smallest f-stop, ensures that your camera has the shallowest possible depth-of-field while automatically setting the shutter accordingly.

Use makeup

If your subject is female and knows how to apply makeup (especially a pancake foundation) so that it doesn't look overdone—encourage her to do so. It can save you a lot of retouching time; and the proofs, which are usually not retouched, will look much more flattering.

Keep shutter lag to a minimum

Minimizing shutter lag is crucial in any situation when the moment that the shutter clicks must be in synch with a critical moment that you are trying to capture. For example, this magic moment may be when a sparkle in someone's eyes corresponds with the peak of his or her smile. In sports, this instant may be the split second when the tackle hits the receiver. Chapter 3 gives you a routine that will ensure that you obtain the shortest shutter lag possible for your camera. However, the most critical factor is the inherent shutter lag in the specific camera that you own. Generally speaking, shutter lag decreases with newer and more expensive cameras. Most professional SLRs have virtually no noticeable shutter lag. The latest generation of circa-$1000 prosumer cameras tends to have extremely short shutter lag times as well.

Pay attention to the subject's eyes

The eyes (unless they are closed or in profile) are usually the most emotionally attention-getting aspect of a portrait, as you can see in Figure 4-4. If the subject's face is changing too rapidly to pay attention to everything and you have to shoot quickly, you should watch the subject's eyes most carefully.
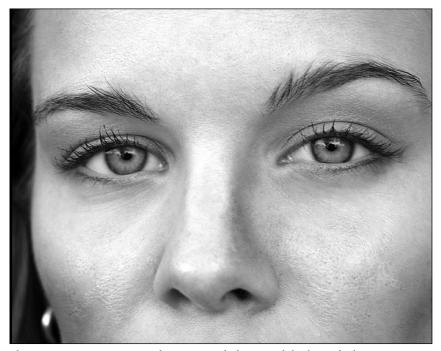
Figure 4-4: A message can be conveyed almost solely through the eyes.

A portrait photography checklist

If you're setting out to shoot portraits, you may find the following items most useful:

- ✦ **A warming filter** is especially useful to warm skin tones in the shade or on a cloudy day.
- ✦ **A diffusion filter** can help to soften the lighting and spread the highlights, which reduces the appearance of wrinkles.
- ✦ **A car windshield reflector** is a useful tool for bouncing light back into shadows.
- ✦ **A gray card** can be used to check color balance when light is bouncing from nearby colored walls, stained glass, or mixed lighting.

✦ **A tripod and remote camera control** can free your hands so that you can hold reflectors or objects to shade or intrigue your subject. These items are also indispensable when shooting portraits at dawn or dusk, when longer exposures are required due to failing light.

✦ **A portable mirror** allows your subject to check their makeup and the details of their clothing or accessories.

Candid Photography

Candid photography is very closely related to portraiture, as in Figure 4-5, so you may want to check the previous section for any hints that sound workable for candids, as well. Because you usually have to capture a moment that happens suddenly and will never happen again, you may also want to check out my suggestions for action photography, located later in this chapter. The most distinguishing characteristic of candid photography from your perspective as the photographer is that you should do whatever you can to make yourself invisible. Otherwise, your subjects are likely to become self-conscious and won't behave naturally or in a way that's realistic for the given situation. That's why most of the following hints relate to the human aspect of shooting candids. Most journalistic photos are considered candids because the photographer reports on what actually happened, rather than on what the subject wanted the world to see.

Be prepared to be mistreated

It is my understanding as a professional photojournalist that if your subject is out in public (as opposed to being at home or in a private office) you have every right to photograph that person — provided that the photograph is not used to exploit that person. However, you may not subsequently use that photograph in order to promote a commercial product or to provide a testimonial of any sort. I don't mean this as legal advice, however. For the real thing, be sure to check with a lawyer.

Unfortunately, there has been bad press about *paparazzi* (freelance press photographers) who will shoot any picture that embarrasses the subject — just because this type of picture is the easiest to sell. We read and hear about this so much that the general public has become increasingly paranoid about having pictures taken. So don't be surprised if you get a hostile reaction.

Generally, the best thing to do if you get a negative reaction is to explain that you're taking the photo to be used as fine art and that you don't want any self-conscious or unnatural behavior or expressions in the photo. Then offer to show them the picture and, in the same breath, offer to erase it if they find it embarrassing. Offer to e-mail them a copy if they like the photo. Chances are, others in the area will overhear your explanation and will relax. On the other hand, you may have to fight off a crowd if you make yourself too popular — but worse things could happen. Of course, the fact that you are using a digital camera is what gives you the ability to make yourself popular by being able to show off the picture as soon as it's taken.

> **Note** If you want to take pictures of strangers that you may later want to sell for com-
> mercial purposes or to a stock agency, or if you just want to make sure you're cov-
> ered, ask your subjects for model releases. A model release form is included on
> this book's CD-ROM that you can print out for that purpose. I usually ask for the
> model release after I've taken the picture and shown it to the subject. At least the
> subject knows at that point whether it contains anything embarrassing.

Dress to blend

Try to fit in with the crowd as much as possible. Dressing the way they dress is really
only part of fitting in. Darker clothing and black equipment are much less noticeable
than anything loud or shiny (unless you're in a crowd of dancing gypsies).

Use a swiveling LCD

Preview monitors that swing and tilt in virtually every direction are a big help in
shooting candids. When you're in a crowd, you can shoot over people's heads, and
when you want to shoot from a very low point of view, you don't have to lie in the
mud. My favorite swiveling monitors are those on the Nikon 5000 and the Canon G2
because they not only make the monitor viewable from virtually every angle, but
they also swing shut in such a way that the surface of the LCD screen is protected
from bumps and scratches.

Use short shutter lag

Capturing the meaningful instant is a required stop on the path to making a great
photo, and reducing shutter lag is instrumental in achieving that goal. Be sure to
turn off any feature (such as automatic flash and the LCD monitor) that may cause
your camera to need any extra time for computed calculations.

Be ready

If you interrupt a candid shoot to go inside for lunch or to make a phone call, take
advantage of the break by changing batteries and film cards. Using your time wisely
will help to minimize the risk of missing a shot because you were too busy making
those changes.

If it's a really sunny day and you can't wait until the light is a little less contrasty
and a little lower in the sky, you may want to turn on your interior flash and use the
Fill Flash mode (if that's a feature on your camera). Remember, however, that the
flash will attract attention. You may find it a better compromise to use the Fill Flash
command in Photoshop Elements or something similar in Photoshop 7 by adding a
layer, filling it with white, and putting the white layer in Soft Light mode. If you plan
to use either of the last two tricks, be sure to use spot or center-weighted metering
and to expose specifically for the highlights.

I recommend that you put your camera into one of the automatic modes so that no matter how unexpected the photo op, you've got a good chance to capture the picture. However, if you prefer to shoot in Manual mode, use an old press photographer's trick called the "10-foot f8 rule." If you set your manual focus at ten feet and your aperture at f8 in Aperture Priority mode, then virtually everything in the picture will be in sharp focus from about one foot to infinity. You can let the camera set the shutter speed and, unless the lighting is really dim, it will be adequate to stop normal motion (anywhere between $\frac{1}{60}$th second and $\frac{1}{500}$th second at ISO 100). If you're shooting later in the day, boost the camera's ISO rating to 200 or 400. The picture may be a bit noisier, but that beats not getting the picture or getting a blurry picture.

Figure 4-5: A coffee house candid

A candid photography checklist

Here are a few items that may make your candid shooting more successful:

✦ **Model releases:** This document is especially useful in case you make friends with one of your subjects and think that you may want to publish the photo. You'll find the text for a model release on this book's CD.

✦ **Extra memory cards and batteries:** You don't want to have to plug-in and download images or stop to change batteries before you're ready to shoot again. Memory cards have become too affordable to make it worthwhile to try to work without an extra.

✦ **A supplementary telephoto lens:** It's much easier to shoot candid close-ups while remaining unnoticed if you use a lens that will keep you 20 to 30 feet away from the subject. One of my favorites to use on my Nikon Coolpix 5000 is the Kenko 6X telephoto. This type of lens also comes in very handy for shooting small things in nature.

Event photography

Event photography usually refers to photographing planned and highly scheduled events. Such events usually take place in very rapid succession, so you will constantly find yourself in new situations and locations. Events usually (but certainly not always) take place indoors. Finally, because events generally have sentimental, marketing, or traditional significance, they tend to be paid assignments and you are expected to not miss anything of importance. Event photography includes weddings, graduations, press conferences and product announcements, and corporate meetings and celebrations.

Get a schedule

If you're planning on recording an event with photographs, be sure to contact the event planner(s) to discuss the schedule, significance, location, and participants for each important occurrence during the event. This is the only way you can sensibly plan ahead and expect to be prepared for challenges that may be posed by crowd presence, lighting quality and level, sensitive issues surrounding the event, and so forth.

Make a shot list

Working from the schedule and with the event planners, make a "must have" list of shots. You may even want to "storyboard" this shot list to include snapshots of the participants so that you and your assistant can identify the important participants and know why they are important.

Take an assistant

If you're going to be serious about event photography, you must have a trained assistant. An assistant can check your camera readings and set up the camera for the next shot. The assistant can also keep an eye on the schedule and let you know

when you must leave one scene to go to the next. An assistant also pins wrinkled wedding dresses, provides makeup for shiny noses when necessary, and can act as your clone when you have to be in two places at once. Having an assistant also means that you have the honor of training a future world-class event photographer.

Use two cameras

In an ideal world, your main camera and your spare camera are identical. This means that you will instinctively know where all the buttons are when your assistant hands you a camera that's already been metered and otherwise set up for the next shot. Remember, you may have to shoot one scene that requires a telephoto lens extension followed by another scene that requires using three slave-synchronized flash units.

Make arrangements to be in the front row

If there are times in the schedule where the scene involves a crowd, be sure you get to the location soon enough to ensure that the crowd won't be blocking your shot. If you want to shoot a wedding ceremony, you want to be in the front row. To capture the couple coming down the aisle, you need to be in position where you can jump into the aisle just ahead of them. When the rice is thrown, you want to be outside next to the car. For all these highlights, the key is planning ahead so that you are in the right place at the right time. I use a wedding as an example because it's such a common one, but similar highlights exist for every kind of event.

Learn to use supplementary flash

Most events are indoors, but you still need to light the whole venue evenly and in a way that appears natural on camera. At the very least, you'll need an external flash that has a guide number three to four times as high as the internal guide number on the built-in flash. If you have to light whole ballrooms or a whole group of graduates, you'll need several flash units attached to slave units that will fire at the same instant as the flash that's attached to the camera. Most slave units make the flash that they are attached to fire when they "see" the light from another flash. However, if numerous photographers are attending the event (such as a press conference), light sensor slaves will fire every time another photographer's flash fires. This will automatically make you the most annoying photographer at the event. To get around this, simply use sonic or infrared slave sensors that can be tuned to fire only at a certain frequency that is unique to the slave-firing unit attached to the camera's flash connector (or *trigger*).

Take a preview screen

At certain types of events, you may want to take along a digital picture frame (a laptop-size LCD screen in a frame) or even your laptop. You can then set up a table that shows a continual "slide" show of the pictures you have been taking as the event moves along. This can encourage more guests to order prints or souvenirs from the photographer. It's also good event entertainment.

An event photography checklist

- ✦ Multiple external flash units and slave triggers
- ✦ A schedule of the event
- ✦ A shot list
- ✦ Twin cameras

Sports and Action

The chief requirements of sports and action photography are a high shutter speed and a long lens. You also have to practice following the action until the precise moment when the shot will be best composed and most meaningful. If you are going to shoot baseball, go to lots of little league games and practice, practice, practice. That's how you get into *Sports Illustrated*. Watching an activity to practice capturing highlights also teaches you about the sport or event, which can help you to acquire an instinct for when the peak of the action may occur.

Use a zoom lens

The ideal piece of equipment is a camera that features a 7:1 or 10:1 zoom lens. It's even better if the same camera has built-in image stabilization. Image stabilization utilizes a variation on an electronic gyroscope, which keeps the image in the same place on the film plane, even if the camera jiggles when the shot is being taken. Image stabilization is important because it becomes nearly impossible to keep the camera steady enough when the focal length of the lens is more than the equivalent of 300mm. The equivalent of a fully extended 10:1 zoom lens can be close to 400mm.

The reason you will need such a long lens is that close-up action photos generally have more impact. Additionally, most sporting events simply don't allow you to get close enough to make the ball or the athlete much more than a fly-speck.

Freeze the action

Most of the time, when shooting sports or action, you want to freeze the action. If you're indoors and within range, using a flash is a good idea because it can freeze almost anything short of a speeding bullet (and some special-purpose flashes can even do that). A flash isn't very practical for indoor sporting events, however. First, it's often prohibited because it can temporarily blind an athlete. Second, only the highest-powered external portable flashes will reach out far enough to light the subject. If you have to shoot indoors, boost your ISO rating to 400 (or even 800, if the camera permits). You'll get a lot more noise in the picture than is really desirable, but that's a lot better than not being able to take the picture at all.

If you're shooting outdoors, you can't depend on the short duration of the flash to freeze the action, because the prevailing light will be brighter than the flash and will determine your choice of shutter speed and f-stop. Because you're trying to freeze action, don't even consider using a shutter speed of less than $\frac{1}{500}$th of a second. In fact, boost the shutter speed as high as lighting conditions permit. Depth-of-field is always a secondary consideration. Besides, a wide aperture and shallow depth-of-field help to keep attention focused on the star athlete.

Pan with the subject

One way to freeze the action at slower shutter speeds is to visually register the position of the subject within the camera frame and then carefully maintain that position while the subject moves. This works best if the subject is moving parallel to the film sensor plane, rather than toward or away from it.

The result of panning to follow the action while using a relatively slow shutter speed is shown in Figure 4-6. Notice that the subject is relatively sharp while the background blurs in such a way as to show the direction and speed of movement.

Be where the action is

Most peak action occurs so quickly that it's a big help to know where the action is most likely to happen. If it's a sporting event, watch the press corps to see where they position themselves. If you've participated in the sport yourself, you'll probably know where the action is going to be. Most extreme sports, such as skateboarding and snowboarding and ski jumping feature one spot where all the action occurs. If you are interested in boxing and wrestling, the action is confined to a ring, so it's not too hard to be within reasonable distance.

Figure 4-6: The skateboarder was shot at ⅟₆₀th of a second.

Use burst mode whenever possible

Unless you're an experienced sports photographer or are otherwise already experienced enough to anticipate the moves of the sport (maybe you were a high school quarterback or an Olympic swimmer), it's going to take lots of practice, luck, or both to precisely catch a peak moment that may occur in less than ⅟₁₀₀th of a second. The best thing you can do until you get good at it is to take *lots* of pictures.

One feature that's really a godsend is variously called *burst, rapid-fire sequence,* or *continuous mode.* All these modes shoot between 3 and 15 frames as rapidly as the limitations of your camera allows. The number of frames and the speed at which they are shot varies so widely that you may want to investigate the capability of your current or future camera, especially if you are choosing it to shoot sporting events. If you haven't bought the camera yet and action photography is your main passion (during daylight hours, at least), you can buy cameras (such as the Olympus C-2100) that are made primarily for sports photography. These cameras are great for rapid sequence shooting and also sport 10:1 zooms (or closer) and stabilization. Most of these cameras feature lower resolution than more general-purpose cameras. Generally speaking, the lower the resolution, the faster your burst mode can shoot — and the more frames per second it can shoot.

Speaking of frames per second, if you're shooting for the Web and 640 x 480 fps (or thereabouts) is good enough for your purposes, you can guarantee catching the moment by shooting a movie instead of a still. Then you can use just the right frame from the movie as your still. This is a perfect technique for illustrating a Web magazine, presentation, or TV show. Simply preview the footage in your video-editing software and save the frame that you want as a still image.

A sport and action photography checklist

The camera that you take on this type of shoot should have the following capabilities:

✦ Extreme telephoto capability

✦ Image stabilization

✦ High ISO setting

✦ Rapid sequence and movie modes

Travel

Travel photography requires special considerations that can affect how you equip yourself and what you should look for when you're shooting:

✦ You are generally too far away from home to run back for something you forgot, so plan ahead.

✦ You may not have another opportunity to capture an image, so try especially hard to get the picture.

✦ You never know what circumstances you may encounter or what transportation will be available, so you will want to have portable equipment.

✦ You can't predict the level of security, so you need to protect yourself from theft.

Always have your camera(s) with you

The chances are slim to none that you'll ever be back here again. Even if you are traveling to a favorite vacation spot, the chances that the fashions will survive another year or that your kids will look the same next year are pretty slim. In other words, you aren't likely to have another opportunity to take the same kinds of pictures. If you're bothered by the idea of being loaded down with equipment (believe me, some people appreciate the extra workout), you can carry along one of those tiny pocket cameras or a pen camera. You can even get pocket cameras with zooms and 4 or 5 megapixel resolution. So you have no excuse not to have at least one camera along.

Having said that, I favor always being ready for most anything. A small photo day-pack can carry two or three digital cameras (or one or two SLRs), a selection of supplementary lenses, and at least one shoe-mount external flash for indoor and night scenes. You can strap a monopod onto the outside of the pack. You'll also want to take along an 80A filter for converting tungsten lighting to daylight. If you will be staying in hotels, take along a laptop computer for downloading and reviewing your pictures, and a tripod. A tripod is the best insurance that you'll get steady sunset, indoor, and evening shots. You can also use your tripod to hold your external slave flash when you want the lighting to come from the side.

Have a way to download images from memory cards

If I'm going to be staying in hotels, I take along my laptop (it has a built-in CD-RW drive), a PCMCIA card reader, and lots of adapters for changing the plugs and current of the country I'm visiting to 110-volt U.S. current. The current adapters are necessary for running my battery chargers, external hard drives, and my laptop.

I also use a Minds@Work Digital Wallet for downloading images if I'm on a backpacking trip and can't afford the weight and bulk of the laptop. In fact, I just carry it along on every trip because it's small and can be used as an external drive for working on the laptop. With the built-in CD-ReWritable on the laptop, I can move photos off the Digital Wallet and onto the CDs. This combination makes it impossible to run out of space to take and store photos while I'm on the trip. This gives me peace of mind that's well worth the extra price of equipment.

Of course, all these items are not absolute requirements. The Digital Wallet alone will provide more than enough storage space for most professional photographers on a travel assignment—even if it involves a couple of weeks' worth of shooting. If you already have a laptop and can't afford the extra monetary hit for the Digital Wallet, using a laptop is a workable (if less portable) alternative. Of course, if you're just a hobbyist and on a limited budget, just take along a couple of 128MB memory cards. Chances are good that you'll be able to find a local computer store that can transfer their contents to a CD-R disc. It's also a good idea to make backups.

Take supplementary lenses and a backup camera

I've mentioned the value of carrying a backup camera in other sections of this chapter. This is the only addition I can make to that statement regarding travel: The less likely that you'll be able to go back to repeat the pictures, the more important it is to take along a second camera. If you're moving up to a newer generation of digital camera, hang on to the older model, too. You can let a friend or another member of the family use it when you don't need it as a backup camera, and you won't suffer the financial hit of the second camera.

Use guide books to plan your shoots in advance

At the risk of getting boring, I'm going to say it again—*plan ahead.* Long before your trip, head for a bookstore and look for two types of travel books written about the location that you're traveling to: A pocket guide and a tabletop picture book. The pocket guide should be one that suits your personality. In other words, don't get a guide for wealthy retirees if you're young and adventurous. If you want to experience the lifestyle of the inhabitants of the location that you're visiting, the Lonely Planet pocket guides or the Poor Richards guides provide a good start. Long before you leave, read the pocket guides thoroughly and use a yellow marker to highlight the sights and experiences that you want to be sure not to miss. The picture book will help you to visualize in advance the societies and scenery that you want to shoot.

After you've used both resources to plan ahead, make an itinerary that will guarantee you the largest number of promising photo ops. I promise that you this advance planning will result in at least two or three times as many photos that you're proud to show off. Besides, your neighbors (or clients) are much less likely to leave the slide show yawning.

Get out early, stay up late, and rest at midday

One way to really increase your chances of success is to shoot when the prevailing light is at its most flattering. Find out at what times of the day the sun is closest to a 45-degree angle (or less) to the earth's surface. Generally this will be before 10 a.m. and after 3 p.m., but this rule is greatly affected by where you are in a given time zone, what your geographical longitude is, and what time of year it is (in other words, whether you're in daylight savings time). Also, if your photography of the local architecture is paramount, find out what general direction your target buildings face. Then you'll know whether it's better to shoot them in the morning, if the building faces east; or in the evening, if the building faces west.

Wherever you are, you can be pretty sure that the lighting stinks at midday (an important thing to remember for any type of outdoor shoot). I recommend that you plan to use your downtime during midday, say 10:30 a.m. through 2:00 p.m., for a few crucial activities:

✦ Have a long, relaxed lunch in a local café. If you're a photo-taking addict, you can spend your time shooting your fellow patrons.

✦ Go back to your hotel and take a nap. Then you can stay up later for the night action.

✦ Do your traveling to your next location. This isn't always the best plan, though. Some of your best shots may be those taken along the road, so you don't need lousy lighting.

✦ Use your laptop to review the photos you shot in the morning.

Take along a monopod

Know before you go that you don't want to miss out on shots that are best taken at a slow shutter speed. These will include almost all interiors, everything shot at sunset (often the most beautiful shots of the entire trip), anything shot in a dark alley (hiding places are sometimes the most interesting places), and many other situations.

Monopods should fold down to less than two feet and expand out to at least six feet. If you don't have room to carry a tripod, you have no excuse for not carrying a monopod. They're even useful as walking sticks, are good defensive weapons if you encounter a rough situation, and can be made rock steady by clamping them to anything that is unlikely to move—from a table to a monument.

Note   Unless your subject is dynamic and requires being captured at a specific instant, use your camera's self-timer when shooting from a monopod or tripod. This is the best insurance that you won't jiggle the camera when pressing the shutter button.

A travel photography checklist

- ✦ Extra batteries and film cards
- ✦ Backup camera
- ✦ Backpack
- ✦ Monopod with ball or tension head
- ✦ Tripod
- ✦ Remote control
- ✦ Supplementary telephoto and wide-angle lenses
- ✦ C-clamp
- ✦ Power adapter
- ✦ Chargers
- ✦ Laptop (preferably with built-in CD-RW drive)

Architecture and Urban Views

Shooting scenes that are populated by buildings poses certain problems. Chief among these is a phenomenon called parallax distortion, which gives the illusion that all the buildings are leaning away from the camera. The next most prevalent problem lies in the fact that the character of buildings lies in small details, such as the patina of their surfaces or the sculpture of the gargoyles. So it's important to keep the camera rock steady and to max out depth-of-field. The following sections outline a few more considerations that pertain to architectural photography.

Minimize parallax distortion

Taking pictures of buildings poses one really nagging problem, called *parallax distortion,* that most digital cameras aren't equipped to solve. Although it sounds awful, parallax distortion is really nothing more than the fact that perspective causes parallel lines, which form the edges and many of the details in buildings, to appear to converge as their physical distance from the camera increases. You can see an example of parallax distortion in Figure 4-7.

Figure 4-7: Notice that the parallel lines seem to converge as the distance from the lens increases.

Unless you have a digital back that fits on a view camera, your camera probably can't adjust for parallax distortion, but you can minimize it by carefully choosing your point of view. If you can stand facing the building dead-on and position yourself so that you are equidistant from all four of the building's edges, you'll never get parallax distortion — just really boring architectural studies. Besides, it's very difficult to position yourself halfway up a tall office building — unless you're a bird. So, what can you do? Just minimize the distance between your shooting position and the center of the building as much as possible, consistent with finding a compositionally interesting point of view.

Although you can't always correct parallax distortion with your camera or viewpoint, image-editing programs can be helpful. Figure 4-8 shows the original shot of a building and the same building after some perspective correction in Photoshop.

Figure 4-8: The second version (right) is a completely corrected perspective, but it has narrowed the building and made it look unnatural.

Use a tripod

Not only do you want your shots to be steady, you want to be able to take your time composing the picture in such a way as to capture the most compositionally exciting point of view. A tripod will keep the camera in the same position while you ponder the alternative possibilities. Using a tripod also makes it possible to shoot smooth panoramas and multiple exposures for extending the brightness range.

Shoot panoramas and high-resolution, multi-shot images

As is the case with scenic nature shots, super-high resolution and large size exhibit prints tend to appeal because, psychologically, they place the viewer inside the scene.

Almost any digital camera is capable of creating a seamless panorama with the help of a special kind of program called *panorama-stitching software.* Some stitching programs will let you stitch vertically as well as horizontally. By shooting a matrix of images that are 3 x 3, you can create a stitched image that is nine times the resolution your camera is capable of shooting in a single frame. At this point in the book, however, I concentrate on techniques for shooting panoramas and high-resolution composite images.

Cross-Reference   You'll find lessons and commentary on a variety of programs that stitch together panoramas in Chapter 16.

If you are shooting a series of frames that will be stitched together, you will get the best results if you use a tripod, so that the camera rotates around a fixed position. Use a tripod head that will let you position the focal point of the camera, which is usually about halfway between the front lens element and the camera's sensor plane (or the *film plane* as it is known in traditional photographic terms). Affordable versions of these heads are available from Kaidan, one of which is shown in Figure 4-9.

Figure 4-9: A Kaidan panorama head

When shooting a shooting a series of frames that will be stitched together, keep the following considerations in mind:

✦ Be careful to rotate the camera without tilting it or altering its height.

✦ Overlap each frame by the amount suggested in the stitching software's manual. This usually requires about a 20 percent overlap on all but the first and last frames.

✦ Set your camera in Manual or Fixed mode so that the exposure doesn't change automatically when panning across areas of differing brightness.

Quite a few digital cameras will place marks on the LCD to help you position the camera for overlaps. Some cameras even come with their own stitching software, or have other "panorama" features. So far, however, Canon is the only company that makes hand-held panoramas a practical possibility. You can tell the camera whether you're going to rotate from right to left or vice versa. Shoot the first frame, and a portion of that frame is then shown as partially transparent and protruding just enough from one edge so that all you have to do to get the proper registration and overlap is line up the partially transparent edge with the new image on the preview screen. It's really very quick and slick. It's a feature I'd like to see on all digicams.

Shoot when the light is most dramatic

Pay attention to the angle and color of the sun on the face of buildings. If the light is likely to be more flattering in an hour or two, you may want to concentrate on other subjects for a while and then come back. For more information about the angle of sunlight in architectural photography, see the section on travel photography located earlier in this chapter.

Shoot multiple exposures for extended range

Buildings are one of the few types of subjects that can look very good in bright, hard-edged light. However, you usually want to see copious highlight and shadow detail in architectural photos — whether the shots are interiors or exteriors of buildings. Because buildings rarely move, you can take advantage of a technique that can really help this situation. Place the camera on a tripod so that it doesn't move at all between shots. (You can see an example of bracketed photos in Figure 4-10.) You then take three to five frames that vary in exposure by between one-third to one-half a stop. Place each full frame (don't crop before you do this, the images must all be the same size and in perfect register) on a different layer in your image area. They must be organized so that the lightest layer is on top, the darkest layer on the bottom, and those that are in between in the proper sequence from dark to light. You then erase all but the brightest area that still shows detail from the top layer, merge that layer with the layer just below it, and again erase all but the brightest areas that still show detail. You just keep merging and erasing until you get to the bottom of the stack.

Figure 4-10: The three photos automatically taken at different exposures

> **Note** This technique is also very useful for shooting product still-lifes in which you want to light the subject from more angles than you have lights. For example, you can light to highlight the edges of bottles in one frame, then light to perfectly expose the labels in another, and then combine the two exposures.

Use light balancing filters when shooting indoors

If you're using tungsten lights that are always on to light an interior, balance them to daylight lighting temperature. If sunlight is coming through the windows, you will want to use daylight gels in front of the lights. Daylight (80A) gels are inexpensive (usually about $2 for a 12-inch square) and can be purchased through any professional camera store. You should also purchase clip-on brackets that will keep the gels far enough away from the lights to ventilate the bulbs so that they don't explode or melt the gels.

If you're worried about having to mix daylight (very blue) with tungsten (very yellow) because the room has no windows or because you are shooting at night, you should still use an 80A filter over the camera lens. Digital camera sensors are really balanced for daylight. When you have to balance for tungsten, the camera's logic circuit has to adjust the picture digitally, which invariably creates some noise and loss of sharpness.

Balance window light with flash (or several slaves)

If you have to color-balance daylight streaming through windows with artificial light, it is better to use a number of slave-driven external flashes that have been spread around the room so that they light all areas evenly. Try to place them so that they face away from the camera and at intervals that will keep the overall level of light consistent. This is generally easiest to do if the flashes use umbrellas to diffuse the lighting source. A diagram for typical architectural interior lighting is shown in Figure 4-11.
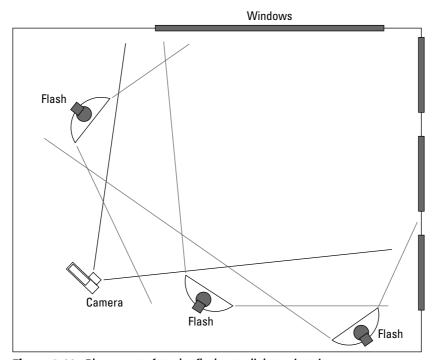
Figure 4-11: Placement of strobe flashes to light an interior

An architecture photography checklist

✦ Tripod

✦ Panorama head

✦ Two or three slave-driven external flashes (for lighting interiors)

Nature

One of the most photogenic subjects is nature. Of course, nature takes many forms and can be seen in infinite climates and lighting situations. Still, some considerations come up over and over again, which I discuss in the following sections.

Move around

Nature photography tends to have a lot in common with travel photography. For one thing, you're most likely to do it while you're moving around. Whether you're out in the woods or photographing your backyard garden, get in the habit of looking at both the close-up and the long view of nearly everything. Because a lot of things in nature demand a fresh point of view, don't forget to take along anything what will help in that effort — especially a supplementary telephoto lens.

Shoot when the light is most dramatic

Dramatic lighting definitely makes nature more interesting. Right after a rainstorm is one of my favorite times because the lighting is soft and hazy, lending a dreamy quality to the scene. At the same time, the vegetation and flowers have a sparkle that is a wonderful sign of life and new beginnings.

Of course, sunrises and sunsets, dawn and dusk, nighttime, and lightning storms also present opportunities that you shouldn't miss. (See Figure 4-12.) If you only wander into nature when it's bright and sunny, you will definitely miss lots of opportunities to take wonderful pictures.

Figure 4-12: Drama in the natural lighting of nature

Use a polarizing filter for dramatic skies

Polarizing filters are a powerful force in nature photography. Depending on how they're rotated, you can use them to control the intensity and shade of the sky. Because they can also cut lighting glare on surfaces, you can also use them to enhance the shade and saturation of color in vegetation. Due to the fact that most digital cameras provide at least one means of previewing the image through the lens, it is easy to preview the changing effect that a polarizing filter has when you rotate the filter. Figure 4-13 shows a scene as interpreted by different polarizing filter rotations.

Figure 4-13: The only difference in these photos is the degree of polarizing filter rotation.

Cross-Reference The fundamentals of creating pleasing composition are covered in Chapter 3. Immediately before embarking on a nature shoot is an excellent time to review these photography fundamentals.

Put some life into the picture

Nature photos are usually more interesting when they include some form of animal life. Of course, this isn't a hard-and-fast rule. Ansel Adams shot numerous classic nature photos in which not a single creature was stirring. On the other hand, any ambulatory life form, from a butterfly to a bear, is likely to draw the viewer's attention into the picture. Then you must consider the fact that the life form often *is* the picture. Who can resist an iridescent hummingbird, a poison dart frog, or a beautiful buck wandering into a sunlit clearing in the forest?

Any time an animal comprises the picture, you're going to want to have a 200mm to 400mm equivalent telephoto lens along. Otherwise, you just won't get close enough to the animal (unless it's a cow or sheep) before it runs away.

Look for texture and color

The details and patterns in nature are almost always fascinating. Try to shoot in lighting that emphasizes the texture and color, as well as dramatizing the shapes in the composition. As Ansel Adams, the world's best-known nature and landscape photographer, proved by his invention and use of the zone system capturing as broad a range of brightness as possible is of utmost importance. If your camera's settings allow you to control contrast or saturation, set both to a minimum. You will capture a much broader range of overall brightness and color. You will undoubtedly want to adjust both, but you are much better off making these adjustments by using your much more powerful computer and placing bracketed shots on layers to insure the widest possible range of brightness and detail.

A nature photography checklist

- ✦ Polarizing filter
- ✦ Tripod
- ✦ Raingear and umbrella
- ✦ Camera raincoat
- ✦ Reflectors

Macros

Macro is the photographer's term for pictures that are taken from very close distances (usually less than two feet). Many digital cameras — most notably those in the Nikon Coolpix series of consumer and prosumer digicams — can focus in extreme macro range. My Nikon Coolpix 5000, for instance, can focus down to as close as 0.8 inches when zoomed to full wide-angle.

Macro photography is indispensable for photographing the small details in nature, in medical photography (especially dermatology and plastic surgery), in many scientific applications, in cataloging (of jewelry or small machine parts, for example), and in forensics.

Use supplementary lenses

If your camera doesn't shoot extreme close-ups unaided, you can get supplementary close-up lenses. You can buy sets of these lenses that you can stack in various combinations that will let you get as close to that flower's pistol or the butterfly's wings as you need to, as shown in Figure 4-14.

Cross-Reference   See Chapter 3 for more details on this topic.
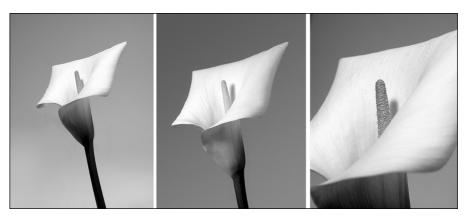
Figure 4-14: Photos of a flower taken with supplementary lenses of 1 power and 3 powers

Keep the lighting flat

Of course, it's not an absolute rule that you must keep the lighting flat: You're welcome to light in any way that will help you to make a great photograph. From a practical standpoint, however, it usually works better to have the light coming from all sides. First, there's less danger that the photographer or camera will cast a shadow across the subject because they are so close to it. Second, one of the purposes for shooting extreme close-ups (ECUs) is to show detail, so you don't want to mask that behind shadows.

One of the preferred lighting techniques for ECUs is a special type of flash called a *ring light,* which is a flash that completely encircles the lens and fits over it somewhat like a lens hood, as shown in Figure 4-15. Because the light is coming from all sides, it casts no shadows whatsoever. This is especially useful in scientific and medical applications, as well as when copying small documents, coins, etc.

Another technique that's more useful for more artistic shots, such as flowers or jewelry, is to use a *lighting tent*. Just take a sheet of plastic or artist's vellum and make it into a teepee, then cut a hole into for the camera lens. Then, light it from outside the tent, which will both diffuse and reflect the light. You can vary the direction and contrast of the light by surrounding the tent with more or fewer lights and by changing the intensity of the light from one side of the tent to the other.

For more casual outdoor macros, I like to shoot on days when the light is just bright enough to see the LCD preview clearly so that I can compose and focus accurately. I then use a diffused external flash to freeze the subject and a white cardboard reflector on the opposite side of the subject to fill the shadows. Because the minimum aperture of most digital cameras ranges between f5.6 and f11 (as opposed to

between f16 and f32 on larger cameras), it's very important to power down the flash or to use two diffusers to ensure that the subject isn't over-lighted. Fortunately, you are using a device that gives instant feedback, so you'll know right away if you have to further dim or back off on the external flash.

Figure 4-15: A macro taken with a ring light flash

Focus with precision at the center of interest

I love using my Olympus SLR for macros because I can see so clearly what I'm getting and can focus so well. However, true (non-LCD) SLRs are not within the price range of many folks. The second best choice is to use the camera's viewfinder. If you do that outdoors, however, you'll need to shield the LCD from the surrounding existing (ambient) light. Hoodman makes very useful hoods that fold flat and attach to the camera with an elastic loop or two — which makes them easy to remove. I also frequently use an inexpensive plastic slide viewer. I use a pair of chef's scissors to cut away the frosted slide holder and then attach of band of felt that will keep out the light. Then I have a magnifying hood that enables me to focus as well as possible given the graininess of LCD displays. Figure 4-16 shows you what the end result looks like. Total cost is a wallet-busting three to four dollars.

Figure 4-16: An LCD viewing hood made from a cheap slide viewer

Stop down for maximum depth-of-field

Because macros are taken from such minimal distances, depth-of-field is extremely shallow. In fact, it can be so shallow that it seems that nothing is in focus because the area that *is* in focus is so small. The cure is to use as small an aperture (high f-stop number) as your camera will allow. Place the camera in Aperture Priority or Manual mode so that you can deliberately set the camera to minimum aperture.

> **Note**   Using minimum aperture may be overkill in the case of pro SLR cameras because, for the most part, they use the same lenses as film cameras. Many film camera lenses (especially macro lenses) sport minimum apertures that are so small (up to f64) that they either create too much depth-of-field or require such a long exposure that you find all sorts of noise in the image. An aperture of f11 to f16 is probably as small an aperture as is really safe.

A macro photography checklist

✦ Close-up (macro) lenses

✦ External flash or ring flash

✦ Cardboard reflectors

✦ Small light tent

✦ Flash diffusing hood

✦ Tripod

✦ LCD hood or magnifier

Summary

This chapter gives you a quick overview of challenges and solutions associated with some of the most common types of photographic assignments. For each of these types of assignments, I have given you the essential means to prepare and equip yourself. I have also given you some hints and provided a checklist of things to take with you.

✦   ✦   ✦

In the Studio

Your digital studio is the hub of your digital photography activities. In contrast to location shooting, the studio photographer has the subjects — whether they are people or things — come to the studio. The well-equipped studio should provide you with all the resources you need to achieve quality work and should represent organization, preparation, and efficiency. This chapter guides you through meeting these goals.

The advantage of a central location dedicated to digital photography is that you have what every photographer wants: control over the image creation. In any type of photography, having control over the lighting is of utmost importance and can be achieved with knowledgeable use of lights (flashes, incandescent bulbs, and so forth), a proper setting, and all of the essential support equipment. In your digital studio, you should expect to have all the equipment that you need for your everyday work as well as for all the surprising and unpredictable encounters that you may want to capture. Furthermore, you want the studio to allow you to make creative choices, such as using an unusual filter combination or bizarre lighting. You also want to be able to make these choices with full confidence that your work path is streamlined for quick and desirable results.

Studio Setup

Studios that are used by professional photographers can be daunting to the businessperson who needs to produce professional results because of the presence of an enormous array of highly specialized tools. The tools range from sophisticated lights, specialized armatures on light tables, camera add-ons, to things that you just can't figure out. You may also find yourself calculating the amount of money that all of this great equipment costs. However, creative photographers also know how to build, modify, fix up, and work around the plight of ever-real, limited budgets. I recommend the following alternative means of acquiring equipment:

✦ **Buy used equipment:** Garage sales and thrift stores are an unending source of discarded items that you can use. For example, "found" items can be a snake-neck floor light that can act as a perfect *gobo light* (described later in this chapter), or a large and sturdy metal frame that can act as your diffuser frame.

✦ **Check out your local art supply store:** The contents of your local art store are worth perusing and remembering because you may find creative solutions to common problems. For example, you may discover that synthetic clay putty in the sculpture department works perfectly to keep small props from falling over. Additionally, pre-made stencils can be used for dramatic lighting effects. In fact, if you knew how high-end shots were created in big production facilities, you'd be amazed — and reminded — that creativity and vision towers over any budget.

It is worth remembering that even the best photographers also have a limited budget. Yet, they are great photographers — not because of their resources — but rather because of their creative use of this art form.

The most important everyday tools in a digital studio are the lights, backgrounds, and camera stands. These pieces of equipment are regularly discussed by studio photographers — often with great passion and heated opinions. However, before I explore this equipment in detail, I discuss some important fundamentals that are essential to digital photography in a studio.

The workspace

The space in which you shoot your work should be equipped with your workstation (computers, printers, peripherals, and so forth) and an area for taking the photographs. Yet no matter how large your "studio," before too long you'll probably want a bigger space, so plan ahead. The physical room should be spacious enough to include the following:

✦ Your workstation table (with lots of surrounding space for peripherals)

✦ The area in which you pose your subjects or set up your product shots

✦ An area for backdrops

✦ The camera and tripod

✦ Your lights and stands

You want to allow plenty of space for your lights and stands — and I do mean *plenty* — because you will often move the lights around and you must still have enough room for everything else, including yourself.

Although it may seem obvious, make sure that the walls and ceiling reflect a neutral color. If you're shooting in a space where you can't paint the walls, consider draping them in fabric or just propping inexpensive foam insulation boards against the walls, which can also serve to block stray light from windows and be used as reflectors. Neutral colored walls are particularly important if you are planning on doing your photo editing in this space. Neutral gray is fine. However, in some situations where no reflections are acceptable, black is required.

Tip The ideal "color" to use for the walls of your image-editing environment is called N8/Grey from the Munsell books of color and has 60% reflectance. Guidelines for lighting conditions in a digital editing room are available through the ISO (International Standards Organization) and are called ISO 3664 and ISO 12646. You should use these guidelines for exacting digital editing where precise color proofing is involved.

You may find that you have to set up a space in an office environment, in which case, the overhead lights are not color-balanced for white and are not color-stable. Common fluorescent lights have a distinct color spectrum and color spikes that will affect the color of your target. Fluorescent lights also flicker. As a result of these issues, you must find a way to eliminate the overhead lighting so that you have complete control of your environment. Lighting from a nearby window can also be annoying because of unwanted reflections. The reflections are particularly noticeable when shooting computer screens. If black blinds are not sufficient to block reflections, an opaque fabric sunscreen must be used instead.

A good work environment includes appropriate storage. You don't want clutter, but inevitably you will have lots of adaptors (electrical and optical), cords, and all sorts of small odds and ends that are essential to your work. Some pros use the top drawer of a cabinet fitted with foam to store lenses. This makes it easy to get to a particular lens or adaptor fast. Also, labeling everything is a wise move. If things are labeled, it is easy to ask the person standing next to the cabinet, "Could you reach over and hand me that quartz dihexagonal dipyramid?"

An inevitable attribute of today's "paperless office" is the myriad of cables that collect. Even worse, storing the cables anywhere often looks downright ugly. However, if you hang your (labeled) wires from the inside door of a cabinet, you can quickly spot the cable that you need and retrieve it without having to untie a huge knot.

Tip A tie rack is ideal for hanging cables.

Did I forget the "other" computer? In the incredibly unlikely event of a computer failure, it's a great idea to have an extra generic, pokey computer that you can use for e-mail and other mission-critical communication. In case the it-could-never-happen-to-me scenario happens to you, you will appreciate Pokey.

Batteries and AC power

The most pervasive problem with digital cameras is that they consume batteries. However, if you're working primarily in the studio, you can avoid this nuisance by using a plug-in battery supply instead. These power packs often have a short cable, which means you should have a multiple-output extension cord near the camera/tripod. A more sophisticated power supply provides all types of power for different cameras, flash units, and video cameras. You should consider investing in a power supply if you are going to have a fully equipped studio.

Nevertheless, keep a good stock of high quality batteries. Surprisingly, various types of everyday AA NiMH batteries have differences. Look for a battery with the highest ampere per hour rating and a quality name brand. You should also use a *smart charger,* which determines the optimal amount of current that it can pack into the batteries without causing damage. Conventional chargers are acceptable if you don't mind the 14-hour charging time, but when you are doing studio work, you need a charger that can refresh a number of batteries fast.

AC power throughout the studio is also very important. Keep the following considerations in mind when setting up your studio:

✦ **Outlets:** First, you must have plenty of outlets to make power available to all areas of the studio. It's amazing how many components you end up using that need power. For safety and organizational reasons, you don't want a situation in which you have multiple power strips connected to each other.

✦ **Clean power:** The cleanliness of your power is also important. You want a few important pieces of equipment:

- **Uninterruptible Power Supply (UPS):** For your computer, peripherals, and camera power supply, make an important investment in a UPS. These units provide immediate replacement power when you experience an outage. A low power UPS rated at 650 watts (which is actually more like 500 watts) is less than $200. The battery capacity of a UPS is often enough for 20 minutes of power, which is enough time for you to properly power down your system. However, don't use it for laser printers or copiers because it spells disaster for both. The only "extra" items I connect my UPS to are my answering machine (so it will always catch messages) and the VCR (to avoid potential jamming of a video tape).

- **Power stabilizer/regulator:** For photographic lighting equipment, if you have any doubt about the stability of the voltage coming out of the sockets — often the case in industrial areas — get a power stabilizer/regulator. Even distant electric motors can cause annoying power fluctuations. Power stabilizers keep the voltage constant, which then keeps the intensity — and often the color — of the lights stable.

- **Power surge arrestors:** All equipment that isn't attached to a power stabilizer/regulator should have power surge arrestors, which are often found on high quality power strips. They are designed for clamping spikes in the line voltage, but they are limited to small spikes and only last for a limited time. Nevertheless, it's a good first wall of protection.

- **Extension cords:** Use heavy-duty extension cords, particularly with your lighting equipment. You will be drawing a fair amount of current, and you also want your cords to be rugged because they tend to get trampled in the rush of shooting.

People conditioning

If your subjects are people, don't forget that they are people. You need to provide them with the creature comforts that will allow them to relax and be ideal subjects. If at all possible, you should provide the following:

- ✦ A bathroom/dressing room
- ✦ A small refrigerator for refreshments
- ✦ Appropriate music (yes, Mozart works)
- ✦ A relaxed sitting area

Tip You'll also find that when working with people, it helps them a great deal by letting them see what you see. A monitor connected to your camera that they can easily view gives them immediate feedback and involves them in the activity of creating a great image.

Studio Lighting

The key to good photography is good lighting. In your digital studio, therefore, you should make wise decisions when choosing what lights to use with a particular shot. The subject of lighting, incidentally, is huge and many books specialize in just this topic. For the purposes of this book, though, I show you only the essentials for lighting in a digital studio.

Lighting for digital photography requires extra consideration because you need extra light. Not only are the sensors less sensitive than with film, but also the dark regions in an image possess more digital noise than in brightly lit regions. With conventional photography, the dark regions are simply dark. With digital images, however, shadows and dark regions are noisy and can look awful. You must also be more conscientious than with film because your *dynamic range* — the range between the darkest dark and the lightest light — is more limited with digital images. You have to limit the dynamic range, or overall contrast, of the image to match the capability of the image sensor. You may think that you can compensate a low-light situation with long exposures. However, long exposures also increase

digital noise. On the plus side, the anomalies that you inevitably experience with different metering systems, hotspots, internal exposure control, and lights are easily viewable — and can therefore be corrected immediately.

Lighting sources

Studio lighting may be categorized into three types of lights, each offering specific advantages — and subsequent costs. The following sections provide a summary of the three choices.

Hot lights

Hot lights have a continuous output and can use conventional tungsten or halogen bulbs. They are the simplest lights to work with and don't require sync information from the camera. Hot lights are not the best choice for photographing people because they're hot and require long exposures and because people move and sweat. However, they are excellent for still objects because you can take your time and see exactly what the camera is exposing.

You can control the brightness of a hot light by varying its distance to the object. Without going into the math, 1.4 times the distance is about half the amount of light. Therefore, you can get a 2:1 lighting ratio by placing one light at 5.6 feet and the other light at 8 feet. The sequence is 4, 5.6, 8, 11, 16, 22, . . . (Do these numbers look familiar?).

A common question is whether a combination of light types can be used together in a shot. Most often the answer is yes. With conventional photography, this isn't the case. However, with the ease of digital color balancing — before or after the shot — digital cameras can compensate for the correct individual color or overall white balance.

Fluorescent lights

In the past, photographers avoided fluorescent lights for studio lighting because of their inherent flicker (which can be a real problem with digital photography), unstable color, and variable light. However, newer fluorescent lights operate at a high frequency, they eliminate flicker, and the bulbs are color-balanced for photographic lighting. Fluorescent lights offer other advantages:

✦ They provide a large lighting region, which is often what you want.

✦ They are actually cool "hot lights" (temperature-wise, that is).

✦ They can be intermixed with traditional halogen lights.

Make note, however, that fluorescent lights have spectral spikes. Therefore, some colors, such as blue and yellow-green, can make objects reflecting these colors appear artificially enhanced. When buying fluorescent lamps, the proper color temperature to choose is 5,000 degrees K, commonly referred to as D-50 (daylight-balanced) lights. The 5,000 degrees K-compliant lamps are based on international

standards, such as ISO and CIE. (Don't confuse these color temperatures with your monitor's 2.2 gamma at 6,500 degrees K white point, or 1.8 gamma at 5,000 degrees K.) Although these lights are rated for 10,000 hours of use, it is wise to replace them after a few thousand hours because their color shifts with time.

Halogen lights

Halogen lights provide good lighting, although their brightness may make people squint. You must also be aware that with such bright lights, you may lose the warm tones in faces. You can remedy this problem by setting the white balance of your camera to "cloudy day." When purchasing halogen lights, aim for a color temperature above 4,700 degrees K, also called D-50 compliant lights. Also note that small, halogen desk lights, often used for lighting tables, operate at an unregulated 12 volts. Therefore, without a voltage stabilizer, the color of the light varies over time. Luckily, digital photography allows you to fix this when you take the photo or during photo editing.

Halogen lights, with their comparative limitations, offer the best simulation of natural sunlight. Therefore, when you need an ideal light source for people or products, halogen may be preferable.

When working with halogen lights, follow some good, general advice:

✦ Halogen bulbs can explode unexpectedly. Therefore, always have a screen over the front of your light fixture.

✦ When using the bulbs for a long time, the color temperature will shift, resulting in off-color images. If you start to see discoloration on the bulb itself, replace it.

✦ Don't hold a halogen lamp by the glass section with your fingers. The oil in your fingers will burn when the lamp is on and cause it to fail. Instead, use non-slip paper or cloth to hold the lamp.

✦ Never exceed the specifications of the fixture that you are using — unless you want "real," once only lighting and momentary drama.

✦ When setting up your lights, you want to have control over the brightness of the lights, which you can easily achieve by using variable power supplies. However, at lower settings, the color may change. So (like always), take a white-light test.

✦ If the image is going to be edited and cropped, place a color test card with a white zone in each shot to help provide a constant reference to white. When editing, go to the white zone and look at the RGB values. They should be all the same, or 255, 255, 255 for the whitest white. The 18% gray should also have identical values for RGB.

When lighting large areas, powerful tungsten or fluorescent studio lights can be a problem because they are often too heavy to hang on the end of a typical boom arm. Not only can they topple over, but also lifting them up a few feet to adjust their orientation is cumbersome. For shots such as these, use any type of strobe light.

Power pack studio strobes

All flash units have a flash tube and a capacitor. With power pack strobes, the flash tube is located in a separate light head — typically on a stand — and the capacitor and power supply are on the ground. A thick cable connects the power pack to the head. In this setup, the camera is connected to the power pack and controls the timing of the flash. Pros use these types of units because of their versatility and great power output.

One great advantage provided by power pack strobes is that they allow you to control more than one head from a single power pack. Multiple strobe heads can then be connected to the power pack. The most versatile power packs are those that allow you to control the brightness of each strobe. The advantage of this arrangement is that you can arrange the heads exactly where you want easily and safely because the heads are small and lightweight and the power supplies are big and heavy.

Monolights or self-contained studio strobes

The difference between monolights and power pack strobes is that the capacitor and power supply are located within each head. The advantage with monolights is that each strobe can be controlled independently of the others and allows convenient control over the output of light from each one. These units are popular because they can be purchased one at a time, depending on need and budget. (You can even use units made by different manufacturers.) The main drawback is that that monolights are top-heavy and must be secured to the floor. Often, sand sacks are placed over the tripod legs to be sure they don't accidentally get knocked over.

Solution Another type of flash is specifically designed for macrophotography. These flashes are rings that attach over the lens and provide 360-degree illumination to the objects being photographed close-up. These types of units are often designed with digital photography in mind and often have their own flash triggering mechanism.

Most digital cameras have inadequate flash capabilities; even worse, they often don't provide a connection for an external flash, which is why *slave flashes* are used. A slave flash is any flash that fires from the flash originating from another flash unit, typically from the camera. However, ordinary slave triggers are often not compatible with most digital cameras because they use a rapid series of pre-flashes — typically two. These pre-flashes are not the same as the pre-flash that's used for red-eye reduction. Instead, the pre-flashes are used to set the camera's white balance. A conventional slave unit fires on the pre-flash that it senses; however, the digital camera only captures the image on its last flash. Therefore, the light emanating from the slave flash won't appear in the shot. You can achieve proper control with flash units designed to work with digital cameras, such as those from Digi-Slave. Their DSF-1 is a flash slave that counts the number of flashes that it detects before it triggers the flash. The DSF-1 can be triggered by either 1 or 2 flashes, which you indicate by flipping a switch on the unit.

You can also trigger your main flash unit remotely. You can attach a peanut-sized device to its hot shoe or pc-cord, and it senses the camera's flash and fires. Using this device removes another cable that would otherwise be cluttering the floor.

Flash triggering uses three types of connections: the hot shoe, the pc-cord, and proprietary connectors. Although the proprietary versions offer more features, avoid them. You don't want to be in a situation where you don't have the type of adaptor that's necessary in order to work with other equipment. The hot shoe and the pc-cord connectors work fine, and most quality flash units offer both on the same body, which is a convenient feature.

Lighting accessories

With the basic choices of lights listed previously, you need other accessories that are available — and essential — in order to achieve the correct lighting for your shots. They allow you to shape the lights; control the beam; diffuse, block, color, and reflect the light; and then mix and balance other lighting sources in order to achieve the ideal illumination. Although all of these are commercial and well thought-out solutions, if you have a limited budget, you can build many of the setups on your own. A typical lighting arrangement is shown in Figure 5-1.
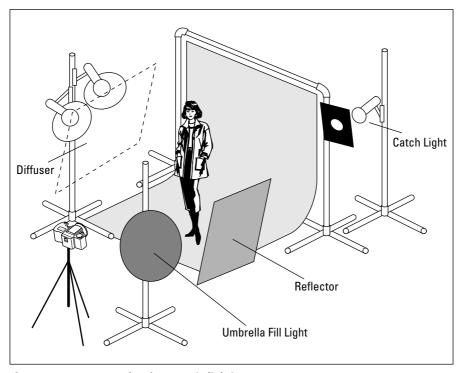
Figure 5-1: An example of a generic lighting arrangement

Diffusers

Diffusers are used with any kind of light. They are placed between the light and the subject and disperse the light in many directions. As a result, diffusers soften hot spots caused by reflections on shiny objects.

Diffusers can also be used for projecting colors onto objects. All you need to do is place colored gels (gelatin filters) into the slotted fitting in front of the light source. High-tech shiny objects that have absolutely no color (and that have no immediately perceivable function) are often lit with opposing colored gels to induce visual interest. The most popular colors of gels for this purpose are red and blue.

Many photographers rely on a diffusion panel as their main light source because they are inexpensive yet versatile. With a diffusion panel, you can create an unlimited number of light source sizes and shapes. You can make a simple diffusion panel that consists of two large frames of 1-inch PVC pipes covered with white rip-stop nylon, as shown in Figure 5-2. One panel connects to another panel with black rip-stop nylon using a series of snap-on, double-C clips that act like hinges. The white translucent panel provides a versatile source of light and the black panel supports it while blocking unwanted light. With this panel arrangement, you place the panel set near your subject: two feet away for a headshot, and six feet away for a full-length shot. From there, you can orient the light source to achieve the look that you desire. The distance between the light source and the white panel determines the size of your light source.
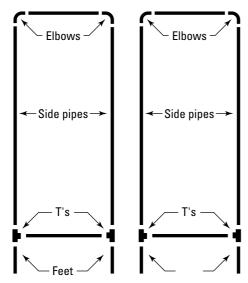
Figure 5-2: A PVC diffusion panel

Reflectors

Two kinds of reflectors are used for studio flash:

✦ **Units that fit around the flash head:** This type of reflector controls the direction and beam of the flash and is the more efficient of the two types. Higher quality flash manufacturers provide a wide range of reflectors that allow you to control the quality and spread of the beam of light, as you desire. For example, the coating of a reflector may be white or metallic. The white coating offers a more diffused light source, while the metallic has a more focused and directed beam.

✦ **Units designed so that the flash head is aimed to reflect the light onto the subject:** Bounce reflectors have an infinite variation of types. The most common is the umbrella reflector, shown in Figure 5-3. Foldaway reflector panels are also convenient and have metallic reflective surfaces. These, like umbrellas, can be stored in tiny spaces. You can use almost any surface with uncolored reflective properties as a bounce studio flash, including the ceiling.
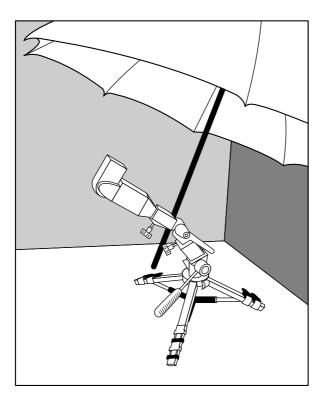
Figure 5-3: An umbrella holder

Note   You may have seen photographers use a simple reflector, such as tape holding a stiff white card on the flash unit, in quick-and-dirty situations. This type of arrangement does work acceptably in a pinch. However, for studio work, where you want the same results every time, it's better to use the right tool.

Soft boxes

Soft boxes are designed so that the light is evenly distributed over a large translucent surface. This creates the effect of a much larger light source mimicking a perfectly uniform natural light source. The light that a soft box produces is soft and even and ideal for portrait work and everyday studio photography. The box design is similar to cardboard boxes, except that they are made of plastic fabric and the inside is shiny and highly reflective. One side fits over the flash head and the other is larger, flat, and translucent; the whole apparatus is very lightweight. Installing a soft box over a flash is fast work, and they often have a special ring (often called a speed ring) that is first attached to the head making installation quick. A soft box is an essential accessory for a basic studio.

Umbrellas

The most common studio flash accessory is the umbrella because it is incredibly versatile and yet inexpensive. Although umbrellas are used primarily as reflectors, you can also use them as diffusers by removing their black backing and shining light through them. Umbrellas are available in a wide variety of sizes, configurations, and surfaces that provide a digital photographer exact and rapid control over the degrees of beam spread, diffusion, and reflectivity. Furthermore, it easily folds down for convenient storage and can be set up quickly again.

An umbrella allows you to adjust for different angles of coverage by simply changing the distance between the umbrella and the flash unit. When using an umbrella, make sure that the light source's beam matches and fills the umbrella's diameter. By doing this, you can efficiently use the flash's light source and create the maximum amount of softness and effective brightness in your lighting.

If you are budget-conscious, you can use an umbrella with your favorite hot shoe flash. With this arrangement, you can orient the flash and umbrella in various configurations to achieve soft lighting. To do this, you need an adaptor that attaches the stand to the umbrella and includes the hot shoe connector for the flash. It may seem crude, but it works fine. The bottom line is this: A photographic umbrella is an essential tool for your studio.

Hemispheric domes

Dome diffusers provide an excellent method for lighting highly reflective objects that require completely uniform lighting, such as jewelry and gems. The dome, which can be as small as five inches and up, is placed on a table and the object is positioned inside. Spotlights can be aimed at the dome from different angles to provide the best lighting condition. The shot is then photographed through a hole in the dome. This produces a perfectly soft and even reflection on metal. When using a dome, you may choose to illuminate it from the bottom as well.

You can build a dome from plastic bowls, but because of uneven surfaces and uneven colors, you should instead purchase a professionally made product. This is especially important for consistency when you are cataloging inventory or writing appraisals.

Snoots

Snoots are the conical-shaped coverings that convert a flash into a spotlight by channeling the light into a tight beam. Snoots are used to highlight a region or to provide specific highlights, such as those within the eye and highlights behind hair. (This specific lighting effect is also called a *catch light.*)

Barn doors

Barn doors look like, well, doors on a barn, and they block light coming out of a light source based on how you angle the doors. They are used to prevent light from straying into areas where it's not wanted. They are placed over a flash head and can be opened and closed exactly to achieve the appropriate illumination over a region.

Honeycomb grids

A honeycomb grid filter can be placed in front of soft light reflectors that provide excellent control over the lighting diffusion. The total light beam is diminished smoothly from the center to the edges and corners. Honeycomb grids with ¼-inch cells, for example, aim beams of light at 60 degrees; and ⅛-inch cells cut the light to 32 degrees. Common beam sizes are 10 degrees, 20 degrees, 30 degrees, and 40 degrees. The cell sizes are available in either black or white for dramatically different effects. White grids produce a more gentle gradation of light falloff and black grids produce a sharper falloff of light. Black grids are best used with objects that are semi-transparent, such as glass sculpture and jewelry.

Gobos

Gobo is a shortened version of "goes between subject." Gobos are often made of black cards that are placed in front of the light source to block light. They are used to keep light from hitting a particular region on the shooting area or to cast a shadow on the background. A gobo of any size can also be used to block part of a soft box to create a smaller light source or to reduce specific bright highlights in reflective surfaces.

Lighting setups

Each photographic application requires a different setup, according to its purpose. Therefore, you must determine the application and its requisite setup before you consider purchasing lighting equipment. Note that some lighting arrangements are not designed for visual appeal. For example, documenting museum sculptures or historic items requires lighting that illuminates all regions of the object, and artistic use of dark regions is not desirable.

The shooting table

For shooting objects on a table, nothing is better than a table (preferable move-able) that is set up for easy shooting. You can buy a table specifically designed for photography, which are excellent, primarily because of their well thought-out versa-tility for lighting and articulating arms. Often these tables offer specific qualities, such as a translucent base and cove. However, many photographers make their own custom table to suit their studio size, typical object size, and application requirements. An ideal table would have a tabletop and background made of milky Plexiglas so that you can light the subject from behind or below. If you are going to build your own table, here is some advice to follow:

✦ Put wheels on the base so that you can move it around when you need the space or want to orient lights in unusual locations.

✦ Make sure that the slope has the proper curve and size for the largest objects you will shoot.

✦ Plexiglas is more bendable when it is warm. Use a heat gun (at a good distance) to warm up the curve before you bend it or set it into its curved sides.

✦ Plexiglas cracks easily, particularly near the edges where you attach it. So drill holes that are slightly larger than the screw width.

✦ Plan for plenty of space on the sides for lights and articulating arms.

✦ Include a region above the table where you can place a bar for holding paper background rolls.

Photographing people

Taking photographs of people is considered by some to be the most enjoyable aspect to photography. Portrait photography is an art form in itself and requires expertise in more than just technology. Yet, the most important advice regarding portrait photography is to know the intent of the photograph before you shoot it. When this is clear, your objective is easier to meet.

The subject of portrait lighting in the studio is vast and many books focus on this topic alone. In this section, I summarize the primary types of lighting that enable you to choose what style you want and how to set it up quickly.

When starting out, you should first learn the basic methods for good lighting and then master them. Then, you can experiment with more complex lighting arrange-ments by using the basic techniques as your foundation. Later, you'll gain experi-ence and expertise in matching the assignment with the best lighting, while always having a standard setup for backup.

The first lighting arrangement that you should know is how to simulate everyday sunlight conditions. This is the type of lighting that people are used to and find most pleasing. Here, you position the light to roughly 45 degrees away from the camera, thus allowing light to strike the subject at 30 degrees. It's that simple. This

arrangement illuminates the subject's forehead, nose, cheeks, and chin, just as sunlight does, and shadows appear appropriately below their most prominent features. The light position is best when the shadow of the nose is apparent, yet just above the lips.

With this type of single-source lighting, you may notice that the contrast is too high. For this reason, you can use fill lights, which may be either strobes or hot lights, to fill in the dark regions of the shadows. (The second light, which has less intensity, is called a *fill light* and the primary light is called the *main* or *key light*.) Note that the fill lighting is more essential with digital photography than with conventional photography. The fill light should be diffused and is best placed just above the subject's eye level so that it creates a soft shadow below the chin. The contrast ratio of the key-to-fill light is often 4:1; however, you should determine what is best in the image. For higher-key fashion and glamour photography, you usually want to cut the ratio to 2:1.

You can also use a single light for the key source and fill light. You can use umbrella reflectors for this purpose and the results are reasonably good. However, for better control, use two lights and position them exactly for the best position and contrast ratio.

You have a lot of control with this simple two-light arrangement. For example, as your key light source becomes larger (and softer), you can use less fill light to create a deeper (and therefore, harder) contrast ratio. Alternatively, as your key light becomes smaller (and harder), you can use more fill light to create a lighter (softer) ratio. This controls the shadows and prevents them from becoming too dark and contrasty, which is more important in digital photography than with conventional photography. The lighting that you choose to illuminate your subject should be an appropriate match, too. For example, flat lighting is best for thin-faced, poor-complexioned people. More directional lighting should be used for rounded, wider faces and those with better complexions. The deeper shadows make the rounded faces look thinner. Also smoother complexions can tolerate higher contrast ratios because deep shadows are zit enhancers.

A *catch light* is a small, directional light source designed to add life and sparkle to the eyes in a portrait. However, it isn't necessarily a third light source and can simply be a reflector. The result looks like a small bright reflection in the center of each of the subject's eyes and appears more natural when it is round.

Basic light setups for portrait photography

It's important to be familiar with the common types of lighting for portrait photography — even if you don't use them all. When you are knowledgeable about the standard types, you can easily choose the type of lighting for the intent of the shot and how best to illuminate the subject. However, don't treat these setups as rules. Experiment with these arrangements so that they offer you creative choices during your shoot. The following are the primary types of portrait lighting:

✦ **Broad lighting:** Broad lighting primarily illuminates the broad side, or the most exposed side, of a person's face, assuming that his or her face is pointing at an angle (such as 45 degrees) to the camera. It flattens the illusion of depth, de-emphasizes facial features, and is useful for making an overly narrow, thin face appear wider.

✦ **Butterfly lighting:** Butterfly lighting positions the light directly between the eyes. This simple and balanced arrangement works well when used with soft lights and is best with oval faces. This popular arrangement can be your everyday lighting setup.

✦ **Short lighting:** This type of lighting illuminates the less exposed portion of the face and is the opposite of broad lighting. Short lighting produces a fine and slightly dramatic lighting, which is good for wide faces and for enhancing facial features.

✦ **Paramount lighting:** In this type of lighting, the key light is 45 degrees to the right of the camera and placed high. The fill light is higher and is located behind the key light source. This type of lighting, made famous by Hollywood's Paramount Studios, flattens features and reduces facial characteristics. This type of lighting emphasizes cheekbones and gives a broad look to narrow faces.

✦ **Loop lighting:** With loop lighting, your key light should be lower than with paramount lighting. The fill light should be the same distance from the subject as the camera, yet higher, while remaining opposite the key light. When setting up the lights for loop lighting, make sure that the eyes are properly illuminated because people look at the eyes first. Loop lighting is the most classic of all portrait lighting styles and should be mastered as your ideal lighting arrangement. This type of lighting helps to broaden the face and works very well with narrow faces. Loop lighting creates a shadow from the nose that goes down toward the corner of the mouth without touching the corner of the mouth. The shadow generated from the key light should follow the natural line of the face, from the nose to the mouth. This is the loop.

✦ **Rembrandt lighting:** In this type of lighting, the key light is lower than with loop lighting and is moved closer toward the background. Like loop lighting, the fill light should be with the same distance from the subject as the camera, positioned higher than the camera, and opposite to the key light. Rembrandt lighting gets its name from the lighting seen in Rembrandt's paintings. It brings out the individual characteristics of a person's face and produces a very dramatic but pleasing effect. A diamond-shaped shadow should be formed below the farthest eye, thus creating a partial shadow on the camera side of the face. You should also see slight illumination on the opposite cheek.

✦ **Split lighting:** With split lighting, the fill light should be positioned even with the camera and placed high. Here, the lights should be positioned so that shadows fall off past the far eye. The key light should be opposite the fill light and placed lower than the position used with Rembrandt Lighting. Split lighting is very dramatic, has high contrast, and brings out the texture and details of a person's face by illuminating half of it. It also makes faces appear narrower.

Don't forget that when orchestrating your lighting set up for the ideal lighting condition, many digital cameras, such as those from Nikon, allow you to adjust the contrast before you shoot. This feature is excellent because, although you may have the best lighting orientation, adjusting one light inevitably changes the ratio to the other light. Readjustment can take a frustratingly long time. When using this feature, lean towards reducing contrast. You can always increase it later in the editing process.

Finally, when working with people, remote-controlled triggering of your shot allows you to time the exposure at the exact time you want. Not all cameras have this feature, but you will find it a blessing if it is available. Keep in mind, of course, the annoying delay typical of digital cameras. When shooting people in any type of situation, experienced photographers know how to anticipate people's expressions. So, with digital cameras and their inherent delay, this knowledge is even more essential.

Light meters

Light meters are essential for attaining good exposures when shooting in the field. Yet in the studio, lighting conditions are more controlled, thus reducing the need for a light meter. So if digital cameras have internal light meters — including some that are very sophisticated — why do you need another light meter? All cameras rely on reflectance of the light for assessing how much light is reaching the camera. However, this may be inaccurate. For example, imagine the difference between shooting an object on a black background and shooting the same subject on a white background. Ideally, the exposure should be the same. With reflectance measurement, however, it isn't. In contrast, incident measurements taken with a light meter in the position of the object read the intensity of light falling on the target. It provides readings that create accurate and consistent renditions of the target's color and contrast — regardless of reflectance, background brightness, or texture. Colors are rendered accurately, and highlight and shadow areas appear natural — with little or no need to alter the histogram in the digital editor.

For hot lights, a light meter also helps you to determine exactly how bright a highlight is. This highlight, which may be something like a section of highly reflective metal, can throw off your digital camera's exposure setting. Additionally, if you are trying to attain a 2:1 ratio between two lights, you need to measure the light arriving at your target. All of the foregoing is also true with flash lighting, but for lighting with flash, you use a flash meter instead.

You may not need a meter, particularly because you get immediate results from a digital camera. However, you may encounter many situations when it does help. When you do decide to purchase a light meter, choose a unit that can serve as an incident, reflectance, and flash meter.

Backgrounds

In the studio, you have the option of providing different types of backgrounds, often called *backdrops,* in the shot. This additional visual element is often a compelling attribute to a great shot. Having choices is convenient because you have complete control over the visual, how bright it is, and how it should be photographed. You can, of course, digitally add and edit a layer as a background after the shot. However, you'll find that the best seam between the two visual elements is one that originally blends the background image with the foreground image.

Backgrounds can be clean with no visual characteristics or they can be any one of a seemingly infinite choice of textures and pictures. So, here too, you must ask yourself, what is the intent of the image? What is it that I want the viewer to experience? Your answers to these questions should describe what type of background is best for your shots.

Caution   Beginning photographers often enthusiastically choose backgrounds that are too brightly lit or that contain images that compete with the subject or object. When you see a background that distracts from the foreground, you know that your message to the viewer is confusing. Try to create backgrounds so that they visually support the intention of the image.

You can use seamless roll paper to create a curved, shadowless background that you can use and throw away when it becomes wrinkled and dirty. The paper roll hangs on a rack that is often up to nine feet high and is typically around 100 inches wide. Typically, between three and six rolls of background paper in different colors or textures hang on a single rack. A professional rack of this sort would cost between $300 and $900. However, you can easily build your own rack. You can build a simple and steady rack yourself from PVC pipe for less than $50, but it will only hold one or two rolls and you have to unscrew the pipe to put the rolls on the rack.

Professional paper rolls are often flame retardant and are available in an amazing range of colors and textures. For digital photography purposes, Chroma-Key blue or green is available. Special digital filters are available that take advantage of these specific colors, which is the ideal choice for automatically creating perfectly shaped selections from semitransparent objects or worse, billowy hair. With these specific colors as backgrounds, the digital filter can detect the color and automatically build a selection of any degree of complexity, which you can then copy to another layer without any "spillover" of the background color. Keep this in mind when you need to place a subject in front of another digital photograph and make it look like they (and you) were there.

Another method for creating realistic backgrounds that appear as if they were shot "on location" is to use a front or rear projection screen to project a variety of images behind the subject. This works fine but requires an expensive setup and experimentation to achieve ideal and believable composites.

Instead of paper, you can use hand-painted muslin, canvas, and synthetic Tyvek backgrounds when you want a thematic image. These are available as seamless or

scenes, or can be custom made. If you do the painting yourself, use flat latex paint. Otherwise, the shiny surface from a glossy paint reflects a bright hot spot when using a flash.

Camera mounting

In the studio, the camera is attached to some kind of stand, making the camera stable throughout the shooting session. You have lots of choices; so making the right decision is dependent on your needs and your budget. In this section, I take a look at what's available.

In photography, the tripod is one of the most important accessories other than the camera itself. It is an essential tool for a photographer, and as a result, most photographers have several tripods, each designated for a particular purpose. I strongly recommend that you have multiple tripods, but in this discussion, I focus on your studio tripod. A tripod for use in a digital studio is different than one for use outdoors. Tripods that are used outdoors should be heavy, rugged, and have simple rubber feet so that they are steady — even in a strong breeze. On the other hand, you want them to be with you when you need them, so they need to be light enough to carry. Luckily, digital cameras are lightweight compared to large format studio cameras. Therefore, you can use lightweight tripods with quick release hinged latches that allow you to extend the legs and set up quickly. Lightweight tripods are available in plastic, carbon fiber, and aluminum alloys. For the studio, use steel. It's heavier, sturdier, and cheaper; and because it's in your studio, you don't have to lug it around on your back.

Tripods commonly have an elevator that you can crank to raise the head up and down, and they may be locked into position. Many professionals leave their tripods extended and place them securely on a dolly so that they can be moved about. However, if you build your own dolly, make sure that the wheels can be locked securely in position.

One of the most important parts of a tripod is the head assembly. Serious photographers choose their tripod head with as much care and diligence as the tripod. In fact, you can buy the tripod and head separately, so you can get exactly what you want in both components. Yet, if you get an inexpensive tripod, don't expect any choice in head types.

You can choose from two common types of tripod heads:

✦ **Ball head:** A ball head lets the camera tilt in any direction with one adjustment because it rides atop a large ball bearing. This is a good choice if you have to quickly reposition the camera. Many photographers love them, but others are afraid that if they loosen the head and forget to hold the camera with their other hand, the camera will flip down, causing damage.

✦ **Three-way heads:** Three-way heads are an alternative and provide three separate, screw-like controls that tighten along the X, Y, and Z axes. The advantage

of a three-way head is that it is easier to precisely control the individual axis of the camera. With three-way heads, you gain accuracy but you lose the speed that you have with ball heads. However, they're absolutely necessary for panning across a level axis, which is essential for making stitched panoramas or for smoothly following motion with the intent of blurring the background.

Because the tripod head is the part of the tripod that you use most, you need to feel completely comfortable with it. Take your time with hands-on testing and select the one that feels best to you. Be sure to test its full range of movement before you buy it.

You don't have to buy a carpenter's level at a hardware store and place it on the tripod base to know what's level — although you can. Instead, you can get a *spirit level,* which is a level that is just the right size and attaches directly on the tripod.

Another feature that you should consider with a tripod is a quick-release camera plate, which is a small pad that screws into the bottom of the camera and stays there. You then leave the plate connected to your camera all the time, even when you are not using the tripod. When you are ready to shoot, the camera plate snaps into the tripod head assembly and locks in place. A quick-release lever releases the camera so that you can detach it from the tripod when you need to handhold the camera. This allows you to move quickly in response to the actions of a moving subject. You can also buy several spare camera plates and attach them to different digital cameras, thus allowing you to switch cameras quickly.

I should also mention rollable camera stands. Many pros rely on these units due to their stability, versatility, and small footprint. Camera stands consist of a pole with feet and have a crankable arm that holds the camera. Rollable camera stands can position a camera, even heavy ones, up to eight feet and still be very secure because of their impressive weight. A rollable dolly generally costs about the same as the tripod it supports, but it sure makes it easier to move the camera when you need to keep up with a live subject.

Essential accessories

Some accessories are downright essential in a well-equipped studio. Here is a short list of must-haves:

✦ **Batteries:** You always need batteries — for your flash, camera, and more. Always have a spare set of fully charged batteries and keep your discharged batteries in a ready-to-charge container.

✦ **Lenses:** Better digital cameras provide a screw mount of some kind to attach adaptor lenses for macro or telephoto applications.

✦ **Filters:** You will find that having a variety of filters comes in handy:

• Neutral density filters allow you to control focal depth by reducing the amount of light.

- Special effects filters can be useful for realistic starlight effects, for example.

- Good soft focus filters are often better than what you can achieve digitally in an editor.

- A polarizing filter is essential. Polarizing filters are great for reducing the unwanted reflections from shiny surfaces. You can change the angle of light that the filter absorbs by rotating the filter to the ideal position. However, when using an auto-focus camera, use a circular polarizing filter instead of a linear filter. (Because the auto-focusing is done through the lens, the linear filters affect its ability to focus correctly.)

✦ **Adaptors:** Inevitably, you will need to adapt one lens or filter to another lens. Plan ahead and match up your equipment before you need it.

✦ **Paperwork:** Yes, paperwork. Have model release forms ready and enter your work in a logbook. Your logbook is a legal document and is essential for calculating what you did and how long it took. Consider this an essential part of a well-equipped studio.

✦ **Fans:** Lights get hot and so do the items and people that you are shooting. Having a well-ventilated space helps your human subjects and helps you, too.

✦ **PCMCIA Card Adapter:** This can download your images directly from your SmartMedia card typically at speeds up to 300 times faster than a common serial connection. Get at least 128MB.

✦ **Extra memory:** You will always need extra memory, regardless of the type that you use. Don't forget to label each one.

✦ **Standard office supplies:** This list should include the following:

- Tape (colored, clear, duct, gaffer's, cable path, and so forth)

- Scissors

- A tape measure

- Pens

- A stepladder

- Seamless paper clips

- Photo clips

- Rubber bands

- Alligator clips

- Wood blocks

- Glue (superglue, rubber cement, and so forth)

- A box of tools

✦ **Extension cords:** You never want to be in a situation where you lack just one more power connection. (Get good quality cords.)

✦ **Sitting:** For portraits, you need at least one posing stool, but don't forget chairs and cushions for everyday use.

✦ **Gofer:** Everybody needs someone to "go for" this or that. What would you do without one?

✦ **Camera bracket:** A camera bracket allows you to grip a camera and flash combination, as shown in Figure 5-4.
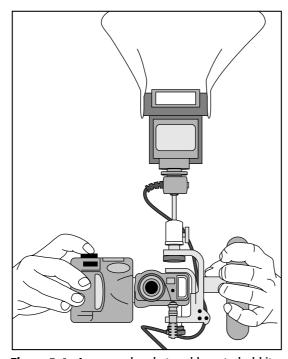
Figure 5-4: A camera bracket and how to hold it

Summary

A well-equipped digital studio offers control over all aspects of the photographic process, thus allowing the photographer to attain the highest level of productivity. In this chapter, I covered the tools for achieving this goal. I described the considerations for creating an ideal workflow in the studio. The sections on lighting (the most critical activity in photography) included the primary choices of lights and how to set them up by using classical lighting arrangements. I discussed the various choices of backgrounds that provide you with maximum control over the image. And finally, I briefly discussed all those little accessories that you need so that you can make the shooting process fast, predictable, and enjoyable.

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Useful Photo Accessories

CHAPTER

6

✦   ✦   ✦   ✦

In This Chapter

Planning the contents of your camera bag

Keeping your camera steady

Using external portable flash units and studio strobes

Using internal and external light meters

Understanding the types, care, and use of lens accessories

Choosing digital film cards

Using card readers

The Wacom tablet and helpful software

✦   ✦   ✦   ✦

Using the right add-ons and accessories often contributes to the success of a photograph as much as using the right camera and exposure. Having the right accessories can also make your life easier. Choosing your accessories ranges from selecting the right camera bag to picking an efficient camera-to-computer interface. It is important to have the right tools for the job, but it is also crucial to have tools that are easy to use. After all, you know as well as I do that when the new toy is too much trouble to use, it just gets neglected.

Your Camera Bag

One of the greatest characteristics of today's digital cameras is that they're small enough to keep with you at all times. Almost all digital cameras are even small enough to fit into the pocket of a jacket or a pair of cargo pants. (Ah, cargo pants! Now that's an accessory no photographer—digital or otherwise—should ever be without.) Despite the portability of the cameras, however, you'll soon acquire enough accessories to make a camera bag necessary.

I actually use two camera bags. One is small enough to carry with me at all times. My bag is a small (about ten inches square and four inches deep) black nylon bag with a fairly generous front pocket, as shown in Figure 6-1. This bag is padded—a very important feature because digital cameras can be allergic to hard knocks—and has Velcro strips on panels inside, which enable me to compartmentalize the bag according to the gear I need for a particular shoot.

Figure 6-1: The "constant companion"
camera bag

I keep the following items inside this bag:

✦ Two digital cameras (an Olympus 2020 and a Nikon 950)

✦ Three CompactFlash memory cards

✦ Three SmartMedia memory cards

✦ A homemade LCD hood (which I sometimes use as a lens hood)

✦ My checkbook

✦ A calculator

✦ A cell phone

✦ A Palm Pilot

✦ A portable flash

✦ A tabletop tripod

✦ Extra batteries

✦ Bug repellent

✦ A pair of accessory lenses (telephoto and wide-angle)

✦ The remote control for the Olympus

✦ A polarizing filter

With this equipment handy, I hardly ever encounter a situation in which I can't take a picture.

You may be tempted to buy a bigger or fancier bag. You can certainly do so, but remember this: fancier bags tempt thieves — especially if the bags are made of leather or brushed aluminum. I figure I'm carrying around $3,000 worth of techno stuff in my bag and I sure don't want to lose it. If my camera bag was lost or stolen, I would lose more than just expensive equipment — I would lose information. (I use the TRG palm computer, which is Palm-compatible but uses the same CompactFlash cards for memory as the Nikon 950, to store all of my valuable notes.) Another consideration to remember is that larger bags hold more equipment, which means they also weigh more. After a few hours of lugging a large bag around, your shoulders will start to ache. As a result, bigger bags tend to get left at home.

My bigger bag is a sports equipment bag that holds the lamp heads for my strobe units, light stands, a roll-up windshield reflector, a backup tripod, and other items that I may need on a location shoot. I leave that bag in the trunk of the car until I really need it.

You don't necessarily need a camera bag, however. For example, several brands of photographer's vests are available on the market. Tamrac offers one that's made of 100 percent cotton with nylon mesh vents so you're not bathed in your own perspiration. The vest boasts ten pockets on the front, four of which have Velcro closures that are pretty easy to get in and out of (as opposed to fishing for zippers). The vest also offers four pockets of various sizes that have nylon zippers for secure storage of smaller objects. You can use the two other pockets for warming your hands on a cold location shoot. A typical photographer's vest is shown in Figure 6-2.

Naturally, if you're hauling 35mm or medium format gear, a vest may not be the only answer. However, if you're only using a basic digital camera setup with an accessory lens or two, a cell phone, extra batteries, and maybe a polarizing filter, a vest may fit the bill.

Figure 6-2: A cotton vest loaded with pockets may be all you need for a really portable setup.

Holding the Camera Steady

Before you think about how you're going to mount the camera, you need to consider how you're going to keep it motionless while you press the shutter. Otherwise, you won't achieve all the benefits from having the camera mounted. Of course, you can simply try to press the shutter button very carefully. Unfortunately, if your hand is the slightest bit unsteady or if you get anxious and press a little too hard or fast, you're still going to jiggle the camera at the moment you take the shot. If this happens, the picture may be a little less sharp than you wanted. A very slight movement is often more distracting than an obvious motion blur.

Capture the image without touching the camera

You have three ways to fire the camera without touching it:

- ✦ Use the self-timer
- ✦ Use a cable release
- ✦ Use a remote control

Use the self-timer

This is likely to be the only method available to you. Digital cameras priced under $1,500 rarely feature a *cable release-threaded coupling* to which you can attach an inexpensive cable release. In my opinion, this is brain-dead design because it costs only pennies to add this very useful feature and you can always buy another cable release if your remote control breaks or fails.

However, most digital cameras do have a self-timer feature, which is usually built into the camera's firmware. To activate this feature, you typically push a button or make a menu choice on the camera's LCD, depending on your particular camera. Then, when you push the shutter button, you experience a delay of several seconds before the shutter fires as the lens finalizes focus and exposure details. As soon as you push the shutter button, take your hands off the camera to give it a chance to steady itself before the shutter fires. This feature also comes in handy when I have to be the "hand model" for a product or assembly shot and I have no one to assist me.

A self-timer is woefully inadequate, however, when photographing people. You can certainly tell your model to freeze at the peak of an expression in order to make an exposure that lasts $\frac{1}{15}$th second. However, don't expect your model to "hold it" and still "look natural" when the shutter fires ten seconds later.

Use a cable release

This brilliant invention, shown in Figure 6-3, was around long before anyone thought of such high-tech innovations as self-timers and remote controls. With a cable release, you don't have to wait a split second longer than the moment when you want to fire the shutter. Additionally, a cable release doesn't jiggle the camera. Best of all, you can buy a cable release at any camera store for a few dollars and it will fit almost any camera — except for most low-end digital cameras (and the most amateurish of 35mm cameras).
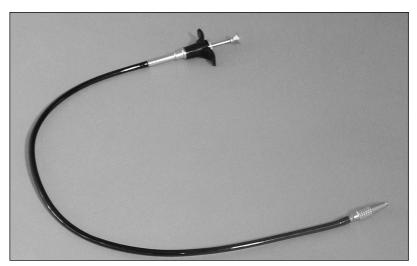
Figure 6-3: A cable release

Cable releases work on most professional digital cameras. This is because most professional digital cameras are really professional film cameras that have been modified or that use a replaceable digital back.

Use a remote control

You are really lucky if you can use a remote control with your camera. Olympus rules in this category (among many others) — the C2000, C2020, C3030, and the C2050 all ship with a remote control. Unfortunately, these remote controls are still a rare feature at the time of this writing, but they are so useful that it can't possibly stay that way for long. The Olympus remote control, as shown in Figure 6-4, not only fires the shutter, but also operates the zoom lens. This remote control also features a pair of buttons that increase or decrease the exposure by one f-stop. My one complaint with this unit is that it's so small — even smaller than a SmartMedia card — it can be easily lost or misplaced.

Tip   If you are working in the studio and your camera has a remote control, you can hook the camera to a TV set and use it as a viewfinder. Then you can zoom the lens and fire the shutter without having to be behind the camera itself. This is an excellent way to communicate with an art director during a commercial shoot or stay comfortable when the camera is mounted at an extremely high or low angle.

Figure 6-4: The Olympus remote control

Tripods

Tripods are three-legged devices made to keep the camera steady — even on uneven terrain. Full-size tripods have a center post that lets you fine-tune the height of the camera platform. The *camera platform* (also known as the *tripod head*) should have an adjustable tilt from front to back and from side to side and should also rotate 360 degrees horizontally.

Tip If you already own a tripod for your video camera, consider buying a new head for your still camera. Video heads have no side-to-side tilt.

My favorite tripod head is the single control ball-bearing type, as shown in Figure 6-5. With one twist of the tightening screw, you can move the camera into any position.

Figure 6-5: A ball head lets you adjust the camera with one twist of the screw. The slot in the side makes it possible to take vertically oriented shots.

A tripod is one of the first accessories that you should consider buying. Most digital cameras have an ISO rating of around 100. This means that handheld pictures taken in anything but bright lights are going to be blurry, especially with the press-to-click shutter lag. Sure, you can use the on-camera flash — but not if you want the situation you're shooting to look natural or the people you're shooting to look good.

If you are working in windy conditions or in a crowd, consider rigging a weight under the tripod. I use a small nylon cord to tie a five-pound dumbbell to the apex of the tripod's legs. Whatever you use, be sure to rig the weight so that it's close to the ground in order to overcome the top-heaviness caused by placing a camera on a lightweight tripod.

Of course, the idea of toting around a heavy and clumsy tripod probably doesn't appeal to you. Besides being obtrusive, it's too easy to clunk some poor soul as you're shifting positions. Far less cumbersome alternatives are available. For those occasions when you really do need a full-size tripod, take solace in the fact that most digital cameras are lightweights. A lightweight camera (even traditional 35mm and APS film cameras) can do well with a fairly lightweight tripod or even a monopod.

All digital cameras use ¼-inch tripod threads, so be sure that any camera-steadying device that you buy also uses a ¼-inch mounting screw. Otherwise, you'll be . . . unscrewed, so to speak.

Tripods aren't just for holding the camera steady; they're also handy for the following:

✦ **Keeping the camera stationary:** Tripods are the best way to keep the camera in one place while you do something else, such as holding an external flash unit high and to one side of the subject.

✦ **Viewpoint:** Tripods ensure a consistent point of view when you're shooting pictures in a series.

✦ **Freezing action:** Tripods are useful in the studio when you're shooting with strobes that are fast enough to freeze both the subject and any possible camera motion.

✦ **Panoramas:** Tripods are a necessity if you want to create a panorama, since the camera's rotation must be confined strictly to a plane. A hand-held panorama isn't going to give you the results you want.

✦ **Flexibility:** Tripods free you to adjust the lights, stand to one side to direct the model, or step aside and let the client peer through the viewfinder.

Miniature tripods

I don't always carry a full-height tripod with me, but I always carry a miniature tripod. These little jewels can be lifesavers. As long as a tabletop, a countertop, or any other solid surface is available to place it on, you have a steady mount for your camera. The hood and roof of my car have also performed this duty more times than I can count. Miniature or "tabletop" tripods come in a wide range of prices and sizes. Figure 6-6 shows a miniature tripod that cost a mere $20 on sale at my local camera store.

Figure 6-6: A miniature (tabletop) tripod

One thing to watch out for with miniature tripods: If you set up the bed for a vertical (portrait) shot, the weight of the camera will probably tip it over. You can either hold the tripod in place with your hand (not very convenient), get an L-bracket that keeps the camera centered over the head, or get a tripod that has a wide enough leg spread to keep this from happening. The tripod shown in Figure 6-6 is very inexpensive and easy to stow, but I recommend using one with a ball head and three- or four-section legs, which can be nearly as compact and are much more useful.

The WING™

EagleEye manufactures a product called the WING™ that provides extra support for the Nikon 950 and 990 cameras. (You'll need the WING II for Nikon 995 cameras). The WING, shown in Figure 6-7, is a simple bracing system made from aluminum that places a support point beneath the lens and prevents strain at the camera's swivel point. If you have the camera mounted on a tripod in the normal fashion and connect an accessory lens to the camera, the lens has a tendency (due to gravity) to slowly — or not so slowly — twist the lens body unit down. The WING places support directly beneath the lens to keep it securely in place. An additional tripod mounting point is centered under the lens. If you connect the unit to the tripod at this point, the camera will then pivot on the lens' vertical axis so you can take panoramic shots. You can order the WING at www.photosolve.com.

Figure 6-7: The WING adds lens support and provides a pivot point for panoramic shots.

The $62 WING (the WING II costs $58) is cushioned at all points of camera contact, so you don't scratch your camera. You can purchase a few optional items that make the WING especially versatile:

✦ **A shutter release kit ($25):** The shutter release is an aluminum shaft that bends over the top of the Nikon shutter. You then screw your cable release into the shaft and fire away. The flexible shaft within the cable release presses down on the shutter button to take the picture.

✦ **A flash mount ($37):** If you want to use an optional compact flash unit above the camera, the flash mount places the flash shoe about three inches above the camera.

✦ **An Xtend-A-Mount™ ($10):** Normal mounting of the Xtend-A-View™ involves applying self-adhesive Velcro to the camera body. With the Xtend-A-Mount, the Velcro is attached to the mount instead of the camera. (The Xtend-A-View is further discussed later in this chapter.)

The Pod

This little gizmo is incredible! Remember the last time you wanted to take a shot using the self-timer on your digital camera? Without a tripod, your main problem was getting the camera set up so it wouldn't fall over. You took the time to get it propped up with crushed beer cans and candy bar wrappers, only to find after the third try that everybody had to get on their knees in order to get into the only shot possible. Well, this doesn't have to happen again. Enter the Pod, which is shown in Figure 6-8. This little gizmo is so simple, somebody should have thought of it years ago. It's a 5-inch wide, 2-inch thick nylon beanbag with a ¼-inch camera mount

threaded screw attached to keep your camera fairly stable on a variety of *semi-flat* surfaces. The base material is constructed of a sort of rubberized nylon, and is just a tad slick. (It will slide off of a car's fender easily enough.) However, the Pod is less than $15 and fits easily in your camera bag. The Pod weighs 13 ounces — almost a pound to lug around — but it's much less bulky than a tripod. You can find one at www.adorama.com (search for "Pod").

Figure 6-8: The Pod is no ordinary beanbag.

Full-size tripods

A full-size aluminum tripod should be black because bright aluminum tripods can cast strange, striped reflections onto your subject. Your tripod should have at least three adjustable sections in the legs to give you as much flexibility as possible in adjusting individual legs for height or for uneven terrain. You want the maximum extended length to be at least five feet so you can keep the camera steady at eye level.

Although they can be very hard to find, a *boom arm* for your tripod makes it possible to aim the camera straight down or to extend it over a tabletop for close-up shots. Bogen makes an excellent accessory "side arm" or boom that fits most tripods and costs less than $50. It is double-headed, so you can attach your pan/tilt head to either end of the arm, as shown in Figure 6-9. You can also hang a counterweight (or your camera bag) on the other end of the arm.

Tip You can jury-rig a boom by clamping a pipe or board to your tripod head and then using a clamp to secure a counterweight so the camera/tripod doesn't fall over. The only thing worse than redoing a setup is replacing a lens!
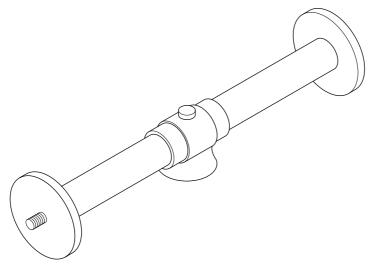
Figure 6-9: The Bogen accessory side arm lets you mount the camera vertically over the floor or a table.

You can make it possible to roll your camera and tripod across smooth floors by adding a dolly, as shown in Figure 6-10. If you're going to do a lot of studio work, a tripod dolly is a most convenient accessory. If you also do video, a dolly is virtually a necessity.
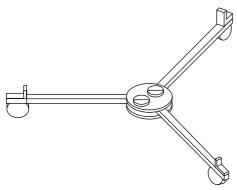
Figure 6-10: A typical tripod dolly

Other means of bracing yourself

Tripods may be the best way of keeping a camera steady, but they won't always be around when you need them. You will also encounter some situations in which a tripod is simply not the best tool for the job.

Monopods

A close relative of the tripod is the *monopod.* (*Mono* means "one." *Pod* means "foot." Think of a monopod as a tripod without crutches.) The monopod was invented shortly before the *bipod,* which became a tripod moments later because the darned bipods kept falling over.

Monopods are much easier to carry than tripods. If you're careful, you can shoot at about ⅓rd the normal shutter speed that you use for a sharp, unassisted, handheld shot. Get a monopod that can use the same head as your tripod. You may not want to carry a tripod on a hike or into a crowd, but a monopod is far easier to carry. On a hike, you can use it as a walking stick, and in a crowd, others are far less likely to trip over it. Finally, if you need a rock-steady shot, you can always clamp it to a chair, ladder, or fence. I've even known photographers who piled rocks around the foot of their monopod. If you do that, put a plastic bag over the foot so that you don't get dirt, sand, or water into the working parts. A monopod can be fairly pricey — Linhof used to sell one for $180. Adorama (`www.adorama.com`) currently offers an $89.95 model, shown in Figure 6-11, that's 14 inches long when collapsed and extends to 58 inches in seconds. It even accepts a ball head.

Figure 6-11: The Adorama Podmatic monopod creates a fairly stable and very versatile shooting platform.

At first thought, you may decide that a monopod is a waste of money. After all, it doesn't stand up by itself, it can wave back and forth, and you can twist the camera. However, these negative aspects can actually be advantages. For example, if you're shooting in a crowd — at a race or a parade, perhaps — you're free to pan the scene, and you still have a pretty steady platform when you take the shot. Most objective camera motion occurs as you're depressing the shutter. As you create a downward force on the shutter release, you have a good chance of moving your arm or hand at the same time. Having your camera firmly mounted on a monopod negates any downward movement of the camera. The Adorama Podmatic comes with a zippered nylon carry case and shoulder strap, and the Podmatic itself also has a carry strap.

Neck straps

Sometimes, you just won't have a tripod handy. If you're smart, you've already found some means to attach a professional neck strap to your camera. This won't always be easy because a lot of digital camera designers haven't been thoughtful enough to place neck strap loops on either side of the camera. Most (but not all) cameras have at least one place where you can attach a strap. Get one of those wire key-ring loops and thread it through that retainer. You can then attach the neck strap clips, as shown in Figure 6-12, to the key ring.

Figure 6-12: A professional neck strap

A good neck strap is the first purchase that you should make in order to protect the investment in your digital camera. A neck strap enables you to always keep the camera on you and at the ready, and it makes it difficult for a thief to quietly pocket your small camera when you're not looking. Plus, you won't drop your camera on the concrete when you're pushed or startled. Best of all, using the neck strap provides a way to steady your camera:

1. **Sling the neck strap so that it passes your neck on one side and under your arm on the other.**

2. **Spread out the strap until it's so tight that you feel pressure pulling the camera toward you.**

3. **Hold the camera on both sides with your hands and push out, as shown in Figure 6-13.**

4. **Start breathing in very slowly as you press the shutter button.**

I don't claim to have a very steady hand, but with practice, I've been able to achieve acceptably steady shots at ⅛th second.
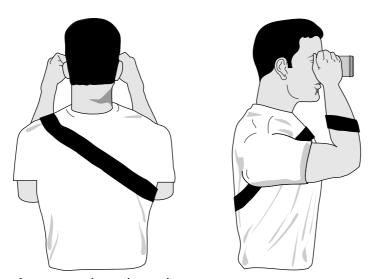
Figure 6-13: The neck strap brace

Finally, you can also use a variety of pistol and rifle grips (these usually require a cable-release socket), as well as chest braces.

Accessories for panoramas and object movies

Most (if not all) of the Olympus digital cameras ship with a program that enables you to seamlessly join a series of images from side to side so that you can shoot a 360-degree panorama. This "stitching" software is getting better and better at finding the areas in adjoining images that should match one another — even if they're a little out of alignment. So, if you have the right software these days (see Chapter 16), you can shoot a pretty decent handheld panorama.

Tip Some of the Olympus cameras come with panorama software that places a grid on the LCD to help you keep the horizon aligned and to give you a guideline for overlapping the edges. If shooting panoramas is something you're likely to want to do often, you may want to keep your eyes out for such a feature.

On the other hand, no matter how "clever" your stitching program, you will do a better job if you keep the camera absolutely level as it rotates, if you take pictures at regular intervals of rotation, and if you rotate the camera on its optical axis. This last requirement is the hard part. Most professional and semiprofessional film cameras have a mark that indicates the location of the camera's optical axis; however, most digital cameras do not bear this mark. This mark allows you to adjust your panoramic tripod head so that it, and thus the optical axis, is centered over the tripod's mounting screw. (You may need a special mounting device in order to center this mark.)

At the very least, you will want to use a level on your tripod head when taking panoramas. Some tripods come with levels built into their heads. You can also buy tilt and pan heads that have a built-in level.

If your tripod doesn't have a level, you have another solution. Take a small, flat piece of sheet metal and drill a hole into it; this makes it easy to place the sheet of metal over your tripod screw. Now you have a platform that protrudes out the back of your camera. You can place a small carpenter's level on the metal. The whole rig, shown in Figure 6-14, should cost you less than $5.

Kaidan (www.kaidan.com) is a company that specializes in making accessories for shooting panoramic and object sequences. You will discover that quite a few of these accessories are available in quite a wide price range.

Flat steel plate
over tripod thread

Carpenter's
line level
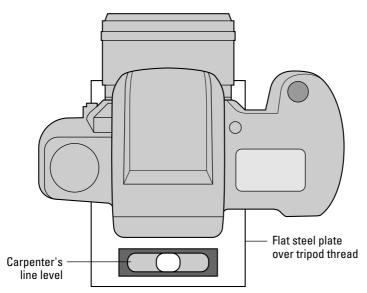
Figure 6-14: A small metal scrap makes a nice level platform, which is especially useful on ball-bearing heads.

Buying External Flash Units

The capability to use a flash unit that can be fired at some distance from the camera is only available in upper-echelon prosumer cameras and in most professional cameras. This is equally true of both film and digital cameras.

You can choose from two basic types of external flash units, each of which can be used in many different situations. I break them down into units that are used at events and those that are used in the studio, but depending on the site and the equipment, studio equipment will work fine in the field as well.

Event strobes

Event strobes integrate the battery pack and the flash head and are small enough to be dropped into a camera bag. They vary in size from as small as a pack of cigarettes to as large as a small saucepan. Event strobes also vary in power; generally speaking, the more power the better. Event strobes are built with portability and ease of setup in mind, whereas studio strobes are meant to remain relatively stable on wheeled or stationary stands. However, depending on your budget and your requirements, you should pick the best compromise between versatility and price.

Try to find a strobe unit that gives a guide rating of around 120 at ISO 100, which is the typical speed rating for a digital camera. This means that you can shoot at an f-stop of about f11 if your subject is about 10 feet away. In fact, you want to shoot with the flash to one side of the camera and at least a couple of feet above it to avoid red-eye and

produce some shadows. The rules for lighting with portable flash are no different than for any other type of lighting, which is discussed in Chapter 5, except that when you are using portable equipment, you're generally not in circumstances that permit heavy equipment and light stands. If you don't have an assistant, you may have to bounce the flash off the ceiling (or a nearby wall) in order to get a natural effect.

To avoid having to buy several different strobe units, try to find a single unit that you can use in as many ways as possible. Choose a unit with a flash head that tilts. Another very useful feature is a built-in slave sensor, which allows you to trigger the unit from your camera's built-in flash. (See "Other Strobe Accessories" later in this chapter for more suggestions.)

Some cameras, such as the Nikon Coolpix 950, are only intended for use with pro-prietary external flash units. These flashes are generally automatic and respond to information that the camera collects on how much light is striking the subject dur-ing a flash. The unit then automatically adjusts the duration of the flash for the proper exposure.

You can also purchase automatic flash units that work independently of the camera's electronics. These units have a built-in light sensor that internally adjusts the flash for the proper duration. Automatic flash units are helpful when you're just getting used the to flash, if you have to do a lot of bounce lighting, or if you don't have the experience to quickly "guesstimate" the proper settings. Automatic flashes are also extremely helpful if your camera doesn't give you direct control over the f-stop.

If your camera does give you control over the f-stop, you can save money by buying a nonautomatic unit, which does what you ask it to do rather than what it insists on doing. Personally, I'd rather save money by investing in a handheld combination strobe meter. (See "Choosing Light Meters" later in this chapter.)

Event flash units have three types of connectors:

✦ **Proprietary:** Proprietary connectors are designed to force you to buy your flash from the manufacturer of your camera. Incidentally, they may also make it possible to use some automated flash exposure features. Most importantly, they prevent you from being able to use a unit that offers just the features you want at the price you want to pay for them. Personally, I avoid proprietary connections like the plague.

✦ **Pc cord:** The pc cord connector is the most universally useful choice. You can buy all sorts of extension cords for them; they work well with studio flash; and you can always buy a replacement cord when the one that came with the unit wears out.

✦ **Hot shoe units:** Hot shoe units work off the hot shoe synch connection fea-tured on some cameras. A hot shoe connection is actually an excellent way to go. You can easily buy a small connector that lets you connect a standard synch cord, yet you still have the option of mounting a hot shoe flash on the camera itself.

Studio strobes

Studio strobes are often taken on location for advertising and interior photography — but it takes a crew. These are big units, often powerful enough to light an entire room (or SUV). All of them work off of standard pc cords. If your camera doesn't have a digital delay, you can also use them with slave units — so you may be able to fire them without a synch cord.

Studio strobes come in two basic types:

- ✦ Monolights
- ✦ Powerpacks

Monolights

Monolights have the powerpack built into the lamp head. Most will only fire one light, but most of these units have a built-in slave sensor. The built-in slaves and powerpacks make them very easy to take on location because you can pack three to six of them in a single case that's easily transported in the trunk of a car. Monolights are also nice on location because they're not tethered together at the powerpack, so it's a little less likely that the public will be tripping over the cords. I say "a little less likely" because most of these units are not battery-powered, so they still need to be plugged into a wall socket.

Of course, you can certainly use monolights in the studio. Their portability simply makes them more versatile. Also, because the lights are independent of a central powerpack, you can add lights as your budget increases and the need arises.

Powerpacks

Powerpack units are divided into those designed for use on location and those designed strictly for studio use. The location units generally contain a battery pack. This means that they can be used in areas with no electricity. On the other hand, virtually all battery packs are meant to power more than one flash head. Look for a unit that lets you adjust the power to different levels for different heads (a fairly common feature).

Other strobe accessories

As soon as you think about using off-camera flash, you'd better start thinking about the accessories that make them work — from flash connectors to light stands.

Slave units

Slave units are used for firing flash heads that are some distance away from the camera without the need for daisy-chained synch cords. Slave units are available in three types; in order of least to most expensive, they are as follows:

✦ **Photoelectric:** Photoelectric slaves are very inexpensive. They make it possible to use an external flash with any camera that has a built-in flash — including most digicams. They're often built into external portable and monolight units. In fact, you should shop for units that come equipped this way because they are much more versatile. You can also buy individual units that have either a hot shoe connector or a pc cord synch post (shown in Figure 6-15), so that they can be connected to either studio or portable strobe units. This is an item that you should always have in your kit. The downside to photoelectric slaves is that they're useless at press events and parties. This is because everyone who has a throwaway camera will set off your slaves every time they take a shot. Also, you can't use most of them outdoors, so they're no good for fill flash.

✦ **Infrared:** Infrared slaves are the next step up from photoelectric slaves. Unauthorized flashes don't set them off, so you can use them at events. Their limitations are that they have to be used in the line of sight and their range is limited when compared to radio-controlled remotes.

✦ **Radio-controlled:** Radio remotes are the best thing since sliced bread. You can place auxiliary units behind walls (so that they can light a distant area without being seen), use them at events, and use them outdoors on location. Their cost, at around $100 per transmitter/receiver, can get a little scary when you're equipping multiple units. On the other hand, if you have an important event to cover or a major on-location commercial shoot, you'll cover their cost in one sitting.

Figure 6-15: A typical photoelectric slave used to fire remote flash units

Light stands

If you're going to use an off-camera strobe at anything more than arm's length from the camera and you don't have an assistant, you need one or more light stands. You can find single-leg light stands that have a heavy weight at the bottom. They're sturdy and take up little space, and they're also excellent for holding up backdrop rolls. However, moving them around is nasty work.

Most light stands have a tripod base and several telescoping sections, as shown in Figure 6-16. Look for a unit that has adjustable leg spread and buy 10- or 12-foot-tall units.
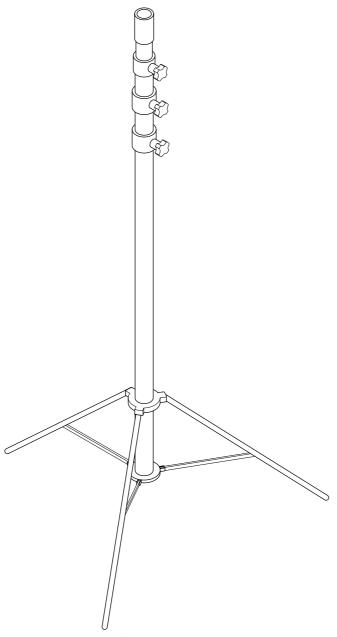
Figure 6-16: A typical lightweight 10-foot light stand

You may need diameter adapters (small sleeves with a hole in the center) to make the lamp heads attach securely to the light stands. Generally, these are supplied with or can be ordered from the manufacturer of your lamp head at a very reasonable price.

Another accessory that I find very handy is a hot shoe light stand adaptor, as shown in Figure 6-17. These make it possible to mount a hot shoe-type portable flash atop a light stand. Because light stands weigh little and assistants can be expensive, this is an excellent way to light event portraits and on-location scenes.

Figure 6-17: A hot shoe adaptor for a light stand holds this Digi-Slave flash unit in place.

Reflectors

Reflectors are the most portable and low-cost means for lightening the shadows in an image, regardless of the type of light source used. The type of reflector that I find most useful for both studio and location work is foam-core sheets. You can buy these at your local office supply store; they are either black on one side and white on the other, or white on one side and silver on the other. You can buy one of each for less than $10. The advantage of foam core is that it's lightweight, so you can easily clamp it to a light stand, as shown in Figure 6-18, or a ladder and position it where you want it. The variety of colors also provides versatility:

✦ **White:** The white side is the side you'll use the most. It provides a soft neutral fill with no hotspots.

✦ **Silver:** When the reflector has to be some distance from the subject, silver is better because it reflects brighter and more focused light.

✦ **Black:** Black is useful for occasions when you want to set a strong mood by deepening the shadows rather than filling them. A large piece of black felt (which can also double as a background) is also useful for absorbing light on the shadow side of the subject when you have a larger subject.

Windshield sunscreens also come in versions that are silver on one side and white on the other. They, too, work well with clamps and light stands. However, I usually hand-hold them when shooting close-ups outdoors. The silver side is especially useful on cloudy days to lend a little contrast to the scene and to brighten up the shadows under your subject's eyes.

Flats (foam core covered with insulation) are terrific studio reflectors for large subjects. I make a frame of 1 x 2-inch fir and staple the foam core to either or both sides. You can paint one side flat black to use as a light absorber. I also use these flats during open studios for hanging fine-art prints of my work.

Umbrellas make wonderful semidirectional reflectors for imitating the light from an open window. These look just like the umbrellas you carry out in the rain, except that their stalks are straight so they line up directly with the lamp head, as shown in Figure 6-19. (When you buy your lamp heads, make sure that they can accommodate an umbrella reflector.)

Figure 6-18: A sheet of white foam core attached to a light stand with a spring clamp

Figure 6-19: An umbrella reflector attached to a studio strobe

Lightboxes, like umbrellas, project a soft light, but it is noticeably more focused than the light from an umbrella. Because of the soft light they emit, they're sometimes called *softboxes*. Lightboxes are extremely useful in product shots when you want directed but soft-edged light.

A lightbox, such as the one shown in Figure 6-20, envelops the lamp head in black nylon, lined with either a white or silver lining. They come in a whole variety of sizes. Many have fiberglass rods that act as the framework of the box. These rods must be bent to some extreme angles in order to get the box together. The bigger the lightbox (often called a *light bank* for reasons that entirely escape me), the softer the light and the more appropriate for lighting large subjects. Lightboxes are the preferred primary light in Richard Avedon-type glamour portraits. They are also widely used in product shots.

Figure 6-20: A top-of-the-line Chimera lightbox

The cost of strobes and their accessories

Table 6-1 is designed to make it easier to judge what you have to spend in order to gather appropriate lighting equipment. Keep in mind, however, that prices change overnight, and thus a great disparity may exist between manufacturers' suggested retail prices (which I try to use here in Table 6-1) and the prices you can find on the Internet or in **Shutterbug** magazine.

Table 6-1
Prices of Strobes and Accessories

Type	Typical Features/Power	Low	High
Portable strobe	Hot shoe (GN 100)	$50	$70
Bracket portable strobe	Professional press (GN 150)	$200	$600
Monolight	250 to 1,500 watt seconds (ws)	$350	$2,000
Powerpack	240 ws to 2,400 ws	$290	$2,000
Light head	Up to 1,000 ws	$175	$400
Light stand	8–12 feet, lightweight to heavy duty	$25	$200
Umbrella reflector	24–48 inch diameter	$30	$100
Photoelectric slave	Pc-cord synch; 1/4" jack; hot shoe; light receptive angle	$25	$50
Radio slave	Pc-cord synch; 1/4" jack; hot shoe; light receptive angle, xmtr/rcvr costs; power source	$100	$400
Lightbox	12 x 6 to 54 x 72 inches	$90	$500

Choosing Light Meters

Three types of light meters may be useful to you:

✦ The meter built into your camera

✦ Ambient light meters

✦ Ambient/strobe meters

Built-in meters

Built-in meters vary considerably in their options and in their accuracy. All of them, however, give you daylight exposure that produces a readable image—provided you have access to decent image-editing software. As you get closer to the $1,000 price

range for digicams, you can expect greater accuracy and versatility. Depending on the brand, the meter will likely be sensitive to much lower light levels and will give you a choice of one of three types of metering:

✦ Center-weighted

✦ Matrix

✦ Spot

Center-weighted metering

Center-weighted metering gives more weight to the brightness values in the center of the image than to the values at the edges. The idea behind this type of metering is to avoid too much influence from the shading in overly dark or light (such as the sky) backgrounds. Unfortunately, photos are usually compositionally stronger when the subject is not dead center. Most digicams let you aim at the subject to focus and get a meter reading, freeze those settings when you depress the shutter slightly, and then move the camera before completing the shot by fully depressing the shutter button.

Matrix metering

Matrix metering is a specialty of late-model Nikon cameras, though other cameras are now featuring it, too. Matrix metering divides the picture area and then averages the meter reading, depending on the location of the various metering segments. More weight is given to segments in the center of the screen than to those at the sides, and more weight is given to segments at the bottom of the screen than at the top.

Incident light reading from built-in meters?

All built-in meters read reflected light. (See "Ambient light meters" later in this chapter for more information.) However, if you want to get an incident light reading without buying a separate meter, you can try a couple of tricks involving 18 percent gray cards and ping-pong balls. Purchase the gray card from your local camera store and take a reading from it; you will get the reading for the brightness of the light falling on the subject at that angle. You can read either the highlights or the shadows, depending on which way you face the card. An even better idea is to cut a ping-pong ball in half and place it directly in front of your meter's lens, which may or may not be the camera's lens — read your manual. Because you are reading a half-dome, you will get a reading for both highlights and shadows. You may have to adjust exposure to compensate for the density of the ping-pong ball, so it's best to shoot a few test photos before you depend on this technique for critical exposures.

Unfortunately, the sophisticated level of matrix metering found in professional and semiprofessional film SLRs is not yet available in under $5,000 digicams. The film cameras with the best matrix metering let you assign your own importance to each segment of the matrix. Of course, this almost requires an SLR because you need to be able to see the matrix overlaid on the exact view of the picture being photographed. Of course, you can do this on the LCD, but you won't be able to see much of anything in bright sunlight.

Ambient light meters

Ambient light meters are external meters that read existing continuous light. They don't read the light from strobes, which is fine if you don't own or plan to own strobes. They're also about half the price of meters that also read strobe.

Ambient light meters come in models that can read incident light, reflected light, or both. Some models even have a spot-metering mode. The brands that seem to generally get the highest praise are Sekonic and Gossen; both companies make a wide variety of meters. I've been using meters from both companies throughout the production of this book and have found them both to be extremely accurate. However, I should qualify this by saying that I have not tested every single model in both lines.

Ambient/strobe meters

Personally, I'm a big fan of combination meters that do "everything." Of course, how much of everything that meters can do varies from model to model. My favorite meter is the Gossen Luna-Pro Digital F (shown in Figure 6-21), which is entirely battery-powered and doesn't need to be connected to a strobe unit in order to get a reading. It reads both incident and reflected light. You switch modes by simply sliding the dome from one side to another. For ambient light, I like to use the meter in both modes and then make a subjective judgment on how I want to compromise the readings. To take a strobe reading, set the meter for strobe, press a button, fire the strobe, and take a look at the resultant reading. Using this meter well requires a bit of study, but the uses for the controls are obvious enough to be discovered by experimentation. I also like this meter for its compact size — it easily fits into my digital camera bag. Best of all, if you shop around you can buy one for under $200 — a pittance for a device that can keep you looking like a pro.

My "other" meter is a Sekonic L508 Zoom Master that performs all the functions mentioned in the previous paragraph, and then adds a very precise spot meter, shown in Figure 6-22. Spot meters are indispensable when a small area in the

frame contains the most visually important subject matter. They are also great for calculating the exact range of data that you want to capture. Some digital cameras, such as the Nikon Coolpix 950, 990, and 995, let you adjust the contrast of the image. So, if the spot meter tells you that you have an unusually wide range of brightness to cover, you can adjust the camera to record lower contrast. Lowering the captured contrast helps you to capture as much of the existing tonal values as possible. Doing so gives you much more freedom in your image-editing program to adjust the final values to your liking.

Figure 6-21: The Gossen Luna-Pro combination ambient/strobe meter
Courtesy of Bogen Photo

Figure 6-22: The Sekonic L508 ambient/
strobe meter that measures reflected,
incident, and spot areas

Choosing Lens Accessories

One of the big drawbacks of digital cameras that are priced under $2,000 is the lack
of interchangeable lenses. However, if your camera has a screw-thread ring inside
the front of the lens barrel, you can probably add supplementary lenses. You may
also need filters and lens hoods in certain circumstances.

Note   Some cameras can't use lens accessories. This is usually because they have lens
barrels that retract into the camera when the lens is not in use. The Olympus
C2000, C2020, and C3030 have such a barrel, but Olympus makes a special
adapter that fits outside the lens. Check with the manufacturer of your camera.

Adapter rings

On the front of the lens barrel, you see a measurement in millimeters; this is the diameter of the screw thread. If filters and auxiliary lenses are commonly available in this diameter, you may not need adapter rings. On the other hand, you may want to use filters or lens hoods that you've already purchased for your film camera. In this case, you'll want a step-up ring like the one shown in Figure 6-23.
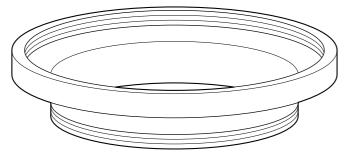
Figure 6-23: A step-up ring adapts larger standard-size accessories to a smaller mount.

The following sizes of filters are readily available through Tiffen:

✦ 37mm	✦ 40.5mm
✦ 43mm	✦ 46mm
✦ 49mm	✦ 52mm
✦ 55mm	✦ 58mm
✦ 62mm	✦ 67mm
✦ 72mm	✦ 77mm
✦ 82mm	✦ 86mm

If your camera's thread diameter doesn't match one of these, you need a step-up ring made by your camera's manufacturer, Tiffen, Coken, or another filter manufacturer. These adapters typically cost less than $30.

Filters

Photographic filters are optically treated and coated glass that either corrects the color of light or lends a special effect to the scene. You may wonder why you would want to use a filter. After all, you can do almost anything to the image when you get it into an image-editing program. However, with an on-camera filter, you can see the effect you want immediately. For instance, there's no substitute for the look and feel of rotating a polarizing filter, and the same effect cannot be created by software alone — unless the real-world lighting just happens to fall in line with the way the software creates the polarizing effect. Here are the most important categories of filters, along with a description of why you may want to use them:

✦ **Ultraviolet:** If you want to protect your investment in a precious digital cam-
era, the first accessory that you should purchase is a UV (ultraviolet) filter.
The primary purpose of a UV filter is to protect the front surface of your lens.
They also remove ultraviolet haze, which tends to lighten skies and distant
objects. UV filters have little effect when you aren't shooting skies or distant
landscapes, so you may as well leave them in place at all times — except, of
course, when you need to mount a different filter. A UV filter costs about $15.

✦ **Polarizing:** Polarizing filters remove glare caused by reflected light. They
also tend to improve color saturation and darken blue skies much more
dramatically than UV filters. A polarizing filter costs about $30.

✦ **Light balancing:** Light-balancing filters come in two varieties:

• **Neutral density:** Neutral density (gray) filters reduce the light coming
through the lens so that you can use a wider aperture to get less depth-
of-field when shooting in brightly lit environments. These filters come in
one-stop increments.

• **Color temperature converters:** Color temperature converters change
the color of light to balance the type of film being used. They aren't nec-
essary for digital cameras because you can do the same thing faster by
using your camera's white balance. Some cameras, however, won't let
you manually dictate the lighting type. For these cameras, you may want
to use a color temperature converter to force a specific mood effect.
Still, you can do a better job of that by just changing the color balance
in your image-editing software.

✦ **Special effects:** Special effects filters are most often used to soften all or part
of the image. Sometimes they are also slightly tinted to warm the image at the
same time it is softened. Softening filters may also be slightly scored so that
light spreads along the score lines to create effects ranging from misty land-
scapes to star highlights. Of course, these are all effects that you can create
after the fact in most image-editing programs. Andromeda (`www.andromeda.
com`) makes a whole series of plug-in filters that imitate special effects filters.
Another set of filter effects by nik multimedia is explored later in this chapter.

✦ **Color correction:** These are filters that are meant to take an overall colorcast out of the image. If you're working with digital images, you can usually do a better job of this in your image editor.

✦ **Color enhancing:** Two types of color-enhancing filters are widely used: warming and saturation-boosting. Once again, you can easily do both of these jobs to a more controllable degree in your image-editing software.

✦ **Black and white:** If your camera has a black-and-white mode, you may be interested in some of the filters commonly used to create effects in black-and-white photography:

- **#8 yellow or #15 deep yellow (often called "orange"):** Yellow filters are generally used for outdoor photography with black-and-white film because they darken skies and make them more dramatic. You can use a polarizing filter to achieve virtually the same effect.

- **#11 green:** Green filters tend to lighten Caucasian skin tones and to make them contrast more strongly with their surroundings. They are often used in black-and-white fashion and portrait photography.

- **#25 red:** Red filters create very dark skies and bright clouds. When they're used with infrared film, foliage turns white and shadow detail is increased immensely.

If you set your digital camera to shoot in black and white instead of color, you'll get a better black-and-white image with greater resolution than you can get by changing the color mode from RGB to grayscale. To that end, filters can be a great boon to your photography and can bring a lot of fun and excitement into your shooting. Use the following generalizations provided in Table 6-2 for filtering with black-and-white shooting.

Table 6-2
Common Filter Recipes for Black-and-White Shooting

Subject	Desired Effect	Filter Suggestion
Blue sky	Natural	Yellow
	Almost black	Red + Polarizer
	Darkened	Yellow-green
	Appearance of night	Red + Polarizer
Buildings	Natural	Yellow
	Textural enhancement	Yellow or red

Continued

Table 6-2 *(continued)*		
Subject	*Desired Effect*	*Filter Suggestion*
Distant landscapes	Natural	Yellow
	Haze reduction	Yellow + Polarizer
	Add slight haze	None
	Increase haze effect	Blue
	Greater haze effect	Red
Trees and plants	Natural	Yellow or yellow-green
	Lighten plants	Green
Lakes and ocean with blue sky	Natural	Yellow
	Darken water	Yellow-green
Sunsets	Natural	None or yellow
	More brilliant	Yellow-green or red
Snow in bright sunlight, blue sky	Natural	Yellow
	Textural enhancement	Yellow or red
Portraits against blue sky	Natural	Yellow-green or yellow+Polarizer

Lens hoods

Lens hoods prevent stray light from striking the lens; stray light creates lens flare when you don't want it. They are also great protection against scratching your lens by bumping into something when the camera is hanging around your neck.

You can buy lens hoods for professional digital cameras anywhere because professional digital cameras use the same lenses as film cameras. However, lens hoods that will fit the small diameter of most prosumer digital cameras' lenses can be hard to find.

Tip   If you have a hard time finding lens accessories or a step-up ring small enough to fit your digital camera's lens, try places that sell video cameras. Most home video cameras have lenses that are comparable in diameter to those found on most digicams.

Focal length and macro lens adapters

If your camera is able to take screw-on lens adapters, chances are good that you can use an optical adapter that effectively changes the focal length of your lens at its widest aperture to a multiple of its usual focal length. You can also purchase adapters that make it possible to work at closer focusing distances. Figure 6-24 shows the Tiffen 1.8x telephoto adapter mounted in front of the Olympus D620L's lens. This adapter can only be used when the lens is zoomed all the way out.

Figure 6-24: The Tiffen 1.8x telephoto adapter and a 52mm step-up ring

Screw-on lenses and adapters work best with SLR-type digital cameras because you can see what you're getting while you're shooting, and because the cameras focus automatically through the lens. However, you may be able to use these accessories by viewing your shot on the LCD of the camera.

You can purchase adapters that increase or decrease the focal length of the lens by 1.4 to 2x. Macro adapters are available that enable you to focus 2x, 4x, and 5x closer than normal. Rough costs for these accessories are as follows:

- ✦ Step-up ring: $15
- ✦ 2x or 4x Macro: $100
- ✦ Wide-angle adapter: $75–$150
- ✦ Telephoto adapter: $75–$150

Some adapters can be reversed to provide either 2x or 4x closer focusing in a single adapter. The same is true of telephoto and wide-angle adapters for film cameras, which you may be able to adapt for use with your digital camera.

Cap keepers

While I'm on the subject of lenses, let me ask you a question: How many times have you taken a shot in a hurry, and half an hour later tried to remember where you left the lens cap? Some cameras have sliding lens covers or shields, and the new Nikon Coolpix 2500 simply twists the lens unit inside the main body for protection. However, most cameras come with a simple lens cap that snaps onto or slips over the lens. When you remove it, you either slip it into a pocket or set it down somewhere. Do yourself a big favor and spend $1.98 for a simple lens cap keeper. They're available at camera stores and are just a little self-adhesive button and string. The button attaches to the lens cap, and the string ends in a sort of attachment for the camera strap ring.

Digital Film

As soon as the image sensor reads a digital image, it is stored on memory media — anything from floppy disks to miniature disk drives. For professional studio cameras, the storage media is generally a computer's memory because the camera is tethered directly to a computer. For professional SLR-format cameras, the storage media is generally a PCMCIA card (often simply called a *pc card*) of the same type used by your laptop. Lately, small hard drives, such as the 350MB drive made by IBM, have become popular.

Prosumer- and consumer-level digicams generally use either SmartMedia or CompactFlash cards, which are shown in Figure 6-25. The Canon A70 uses two CompactFlash cards and the Olympus C2500 can simultaneously use one CompactFlash card and one SmartMedia card.

Figure 6-25: A CompactFlash (CF) card (left)
and a SmartMedia card (right)

Each of these memory formats has unique advantages, but have something in common: widespread standard use. CompactFlash is slightly more popular than SmartMedia, but if you choose a camera that uses both formats, you can move up to a wider choice of cameras after you've collected several of these cards. You're also more likely to find extra cards when you're in a foreign country on a location shoot.

Both formats come in a wide variety of capacities, and the maximum capacity of both formats keeps going up. At the time of this writing, you can buy a card in either format that holds 128MB worth of images. Microtech has CompactFlash cards that can handle a whopping 512MB, and SanDisk recently introduced a 1.0GB CompactFlash card. With this space, you can store about 1,000 "superhigh-quality" digital images on a single card. This tiny card with the big memory comes at a hefty price as well — just under $800. I can painfully remember spending $400 for 4MB of RAM for my Macintosh SE, so the price seems quite reasonable.

The advantages of the CompactFlash card are programmability and ruggedness. The circuitry isn't exposed, as it is with SmartMedia, so you face less risk of ruining the card by scratching or fingerprinting it.

The cost per megabyte of digital film tends to decrease with the capacity of the memory card, although very high capacity cards may sell for a premium for the near future.

It's always a good idea to have more than one memory card. Otherwise, you'll find yourself away from your computer and "out of film." Of course, you can always erase some images. However, you don't want to rely on this option because you'll inevitably have to erase images that you'd rather keep.

The following list gives you a rough idea of the costs of digital film:

✦ **32MB:** $25–$30

✦ **64MB:** $40–$50

✦ **128MB:** $75–$90

✦ **384MB:** $270–$360

✦ **512MB:** $300–$500

✦ **1GB:** $700–$900

If you purchase several SmartMedia cards, you may want to purchase the Olympus SmartMedia Wallet to give yourself an organized way to carry and protect the extra cards. These are available through B&H Photo at www.bhphoto.com.

Card Readers

If you're new to digital photography, it won't be long before you'll want a card reader of some kind. Card readers cut the time necessary to transfer images from your camera to a computer to a fraction of the time necessary to transfer them directly from the camera. This is even true (to a lesser degree, of course) if your camera has a USB port, as many of the newer Kodak models do.

Lexar, Olympus, Simple Technologies, and Microtech all make card readers (though that's not an exhaustive list). Some models even read multiple card formats.

Be sure that your computer hardware will accept the card reader's connection interface. Some older computers or operating systems will not accept USB, and newer computers won't take SCSI without additional PC cards. Card readers are available for all of the standard interfaces: serial, parallel, SCSI (though not very popular), and USB. The best of these choices is USB, for the following reasons:

✦ The data transfer rate is much faster than all but the latest SCSI or FireWire standards. Olympus states that their USB readers download 80 times faster than a serial connection — about one image per second at the super high quality compression setting.

✦ The connections and the interface are exactly the same — regardless of computer platform.

✦ You can plug the device into any computer with a USB port — though you need to install the driver for the card reader first. This makes it much more likely that you'll be able to find a computer to download to when you're in the field.

✦ The readers easily fit into a small camera bag because the cable and connector are very small and no power supply is required. (USB card readers can take their power from the computer.)

Most card readers sell for around $50, though I have seen a few bundled with cameras and have occasionally found them on sale for as little as $15. Card readers that can read multiple formats cost more, but it certainly beats having to buy more than one if your business has to support users of different brands of digital cameras.

If you own a laptop computer, you may also consider a PCMCIA adapter as your card reader. In fact, if your laptop doesn't have a USB port, this is your best choice. Furthermore, PCMCIA cards are even faster at transferring images than USB readers, but then you'll probably want to transfer the images from your laptop to your desktop computer. In either case, a PCMCIA card is the fastest and most portable way to download your images.

Note   It is possible to buy a PCMCIA card with a USB connection. This isn't as fast as using a PCMCIA card reader, but it may make it easier for you to use the same card reader on your desktop machine as you use on your laptop.

Instant Upload

Many new products are being developed every day for the digital camera market, and one type that's caught my eye is the new breed of USB reader/writers, like the one shown in Figure 6-26. Microtech makes one called the ZiO! that has a USB connector on one end and a slot on the other end that accepts mainstream storage media. This connector is only slightly larger than the media itself. You have to get one for each type of device, but at under $30 each, it's a good thing to have in your camera bag. Just plug the ZiO! into the computer's USB port and slip the memory media into the other end. It shows up on the computer's desktop as if it were any other kind of removable media, such as a floppy or Zip drive. The ZiO! has no cords, no external power supply, and draws any necessary power from the computer for the file transfer.
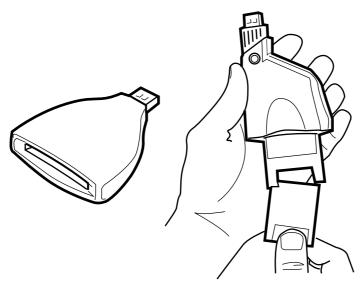
Figure 6-26: The single-format ZiO! (left) and the multi-format FlashGO! (right)

Imation has introduced their version of a memory reader called the FlashGO!. This device is USB-powered and boasts to be the first reader/writer to support all types of flash/memory card formats. It will also be adaptable for any future miniature storage formats, and currently supports CompactFlash (I and II), SmartMedia, MultiMediaCard, SecureDigital, Sony Memory Stick, and IBM's Microdrive. This product retails for less than $60, and it works on all USB-endowed computers.

A step farther up the road is the realm of the MindStor from Minds@Work. The MindStor is a palm-sized device that weighs 12 ounces, and reads/writes CompactFlash, SmartMedia, Sony Memory Stick, Panasonic SD Memory Card, IBM's Microdrive, Intel StrataFlash, and MultiMedia Card. The reader comes in three configurations: 5GB, 10GB, and 20GB, ranging in price from $289 to $399. The MindStor boasts an LCD screen with scrolling menus, but the main feature is that it is both USB and FireWire (EEE 1394) ready. By using USB, you have a transfer rate of 600–800Kb/second; with FireWire, you can slide those photos to your computer at 18MB/second. Considering how many images you can get on even the smallest 5GB model, the FireWire connectivity alone makes it a good deal. With the MindStor in your camera bag, you can upload your digital film in a few seconds instead of getting out the laptop and connecting a card reader to it. Unfortunately, you can't view the images that you're transferring, but if you're on the road or in the field a lot, a MindStor is a definite must-own.

Batteries

Digital cameras eat AA batteries at such a rate that they will cost you more than film unless you buy rechargeables. These come in two varieties: NiCad (nickel-cadmium) and NiMH (nickel metal-hydride).

The batteries that you want are the NiMH batteries. They last two to three times longer than NiCads when used in a digital camera and they don't have to be fully discharged before recharging. Of course, NiMH batteries cost two to three times as much as NiCads and they're a little harder to find. However, you can buy a set of four Quest batteries with a Maha charger for about $30 online.

Note   I mention the Quest batteries because they're getting all the buzz on the digital camera list servers as being the longest lasting and least expensive.

Odds and Ends That Count

When it comes to accessories, the possibilities are endless. A couple that fall outside the obvious categories are LCD hoods and exposure targets.

LCD hoods are an absolute necessity for anyone serious about shooting with a digital camera. This is because it's tough to see the image on the LCD clearly if you're shooting in light that's bright enough to enable a handheld exposure at ISO 100 (even though they're getting a lot better — and some are a lot better than others). You can easily make your own LCD hood from a piece of lintless matte-black cardboard, available at any art supply house. See the diagram shown in Figure 6-27.

Another way to keep the LCD shaded is to simply throw a dark cloth over your head. Your local fabric store can offer something appropriate. A square yard piece of tightly woven black nylon, seamed around the edges, will do quite nicely.

Now, if you want something much more professional and sexy-looking (and you don't mind spending $20), the Hoodman nylon LCD hood fits 2–4-inch LCDs. You can order it through the Web site at www.hoodmanusa.com. The Hoodman installs to the camera with elastic bands that make it easy to put on and take off. It folds up so you can conveniently put it into a pocket or your camera kit. It extends about two inches from the LCD screen, providing darkness so you can see the image better. You still have to view the image from normal distances, however, because it doesn't include a magnifying lens.

Figure 6-27: A homemade LCD hood

A model that makes you feel like you have an SLR in your hands is the Xtend-A-View™ from Photosolve, shown in Figure 6-28. It's made out of aluminum with a magnifier that fits over the LCD screen. The view is quite similar to putting a loupe on your monitor — you see the actual pixels that make up the image in the LCD window. You must apply Velcro to the camera body — this involves self-adhesive goo going onto your camera's body — so you want to consider the fact that you have to ultimately remove the adhesive if you sell your camera later on. The upside is that if you have multiple digital cameras, you can move the Xtend-A-View from camera to camera with ease. This makes it somewhat easier to use the LCD screen for focusing as well as shielding it from light. You can check out this item at www.photosolve.com. Two models are available: The Xtend-A-View that fits most LCD screens is $25, and the wide model goes for $28. An optional rubber eyecup for comfort (and if you squeeze it to your eye socket, stability) sells for $5.

Gray cards are very useful for setting your built-in meter to a neutral brightness level. You can purchase a pair of Kodak R-27 18 percent gray cards from B&H Photo for $14.95. No-name gray cards are available from the same source for about half that price.

Figure 6-28: The Xtend-A-View creates darkness around the camera's LCD and adds a magnifying lens to aid you in composition and focus.

Going the Extra Mile

The last section of this chapter focuses on some fun stuff and the ability to create the image that you wanted in the first place. I briefly explore a nik product, named Color Efex Pro! This plug-in can turn a cloudy day into the sunniest day you've ever seen; it can turn the sunniest photo in your collection into a dark, foreboding midnight scene; and it can take a shot that you photographed yesterday and make it look as if it were printed 50 years ago — all with a mouse click or two. You can download demos of nik programs from www.nikmultimedia.com.

The Color Efex Pro series contains many filters that are considered useful to some and unusable by others, depending on the user's point of view, profession, and desired end result. To that end, nik broke out three different sets from Color Efex Pro, each of which runs around $99, to more closely dovetail filters with user interest:

✦ **Classic:** This set contains the traditional filters that a professional photographer may have for his or her lenses:

• Several Graduated Color filters

• Lighten Center

• Monday Morning

• Old Photo

• Skylight

• Sunshine

- Brilliance/Warmth
- Classical Blur

✦ **Design:** This set has the following filters:

- Brilliance/Warmth
- A Couple Bicolor filters
- B/W Conversion
- Five Contrast filters
- Two Graduated filters and Midnight filters
- Duplex
- Monday Morning (Blue)
- Polarization
- Pastel

✦ **Artistic:** This set has the following filters:

- Brilliance/Warmth
- Three Bicolors
- Color Stylizer
- Duplex
- Two Graduated filters
- Ink
- Three Midnight filters
- A Sepia Monday Morning
- Old Photo
- Solarization
- A Quick Sunshine filter

The Color Efex Pro Abstract set is described later in this section, but also has a couple Monday morning filters.

The complete set is a "best bargain" with a list price of $299. Color Efex Pro is a series of 55 filters that range from 46 conventional photographic filters that a professional photographer may use while taking photos or printing them, to a group of 9 abstract filters. The price may seem steep at first glance, but if you're a professional photographer or artist in need of creative solutions to everyday problems, the package pays for itself in the first couple jobs you use it on. It also saves you a bundle against the cost of "real" filters that you have to worry about losing, breaking, or carrying around in your bag. After you try it, you'll agree that beyond "saving" the occasional job, the creative license that it provides offsets any price. With a few mouse clicks, you have

images that were once impossible to attain in any photo-editing program without hours of masking, layering, and filtering.

The nik Color Efex Pro applies a color or contrast filter to an image, thus allowing you to adjust the amount of color, the midpoint of a graduated bicolor filter, the width of the colored blend, the angle of the gradation, and the intensity of the effect. You can accomplish all the adjustments in a single window with one to five input sliders. Some filters modify saturation; others modify contrast, color, blur, and special effects. All you have to do is drag the nik Color Efex Pro folder into the Plug-ins folder of your Photoshop-comparable application. The plug-in appears at the bottom of the Filter menu.

The nik Color Efex Pro! Workspace

If you've used nik Sharpener Pro, you've seen the basic Color Efex Pro workspace, as shown in Figure 6-29, because the windows are very similar. The image preview dominates the right side of the window and slider controls occupy the left side. Buttons for Save, Load, Help, and Acceleration are below the sliders. A Text Output Area is located at the bottom that provides information about the filtered image.
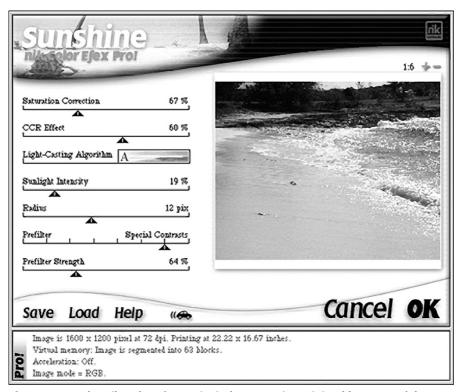
Figure 6-29: The nik Color Efex Pro! window contains minimal but powerful control sliders.

You may run individual filters successively to create intense effects or deliberate moods. At times, you will use Color Efex Pro to correct an image, but most times you will enhance the image to make it more like what you wanted to photograph in the first place. For some projects, such as product catalogs or Web sites, you may want to run a particular filter on all the images to create an environment for your audience. With 55 filters, you can create a lot of environments.

Fifty-five filters is a lot to work with — and to explain — so I only run over generalities for the majority of the filters and get specific with a few. The basic operation is to start your image-editing program and open an image. Select nik Color Efex Pro! from your Filter menu, and prepare yourself for a lot of happy results.

You can start with the most dramatic filter, the Sunshine effect. The effect (or filter, as you wish) has one of the largest amounts of controls of the collection. Taken in order, the following is a brief description of the controls:

✦ **Saturation Correction:** This control holds the top slot in the section and the slider controls the saturation in (mostly) bright colors. Overuse of this variable can get ugly, and so restraint is necessary. A little goes a long way.

✦ **CCR Effect:** The Cold Color Reduction Effect warms cool colors, and like Saturation, should be used sparingly or "soft" images will result.

✦ **Light-Casting algorithm:** This collection contains three algorithms and one "off" switch. Each of the three variables describes a different way to add or cast light in the image. The settings are labeled A, B, C, and D. D is the off switch. Because each image that you work on has its own set of variables in color, contrast, brightness and so on, a B setting in one photo may work well, but not be effective at all in another photo. You'll probably find that the A setting provides the best overall appearance.

✦ **Sunlight Intensity:** This slider works in conjunction with the Light-Casting algorithm to determine the amount of "sunlight" added to the image.

✦ **Radius:** In real life, objects reflect light, and this is most dramatically seen with bright objects reflecting light onto darker shadow areas beneath those bright objects. This effect is carried out in the plug-in, but you need to enter a maximum radius in order to make the effect "work" correctly. The engineers at nik suggest a setting of 1/80th, or 0.0125 of the height or width of the image as a starting point. For example, an image that's 1000 pixels wide receives a radius of 12 to 13 pixels. Naturally, you can change that figure to suit your image.

✦ **Prefilter:** Before the "sunshine" is added to your image, the program runs a prefilter that you determine in this slider. The names are rather general, such as Nature, Special Contrasts, and Combination, but by selecting them and observing the preview, you'll find one that works — regardless of the name.

✦ **Prefilter Strength:** This slider simply defines how much of the prefilter effects show in the image.

You can use other filters to create some special moods. I shot the photo shown in Figure 6-30 in the mid-afternoon. In color, the photo isn't too bad, but it's just not very interesting. By running the Midnight filter on the image, however, I ended up with the image shown in Figure 6-31. The filter has darkened the entire image with a deep blue and added a soft blur to highlights in order to create that moonglow effect. Talk about repurposing images!

Figure 6-30: A daylight shot of a Bahamian beach

Figure 6-31: How the shot may look at midnight, thanks to Color Efix Pro

Taking the lighting one step further, I ran the Lighten Center filter on the image, the result of which is shown in Figure 6-32. This filter is similar to a lens flare without the lens attributes. It creates a bright spot in the exact center of the image. You can decide how bright and how large the center light spot should be.

Other filters include a versatile B/W conversion, bicolor filters, contrast filters, graduated color filters, five types of midnight, and four Monday mornings. All have some sort of slider adjustments that you can make to stylize the photo exactly the way you want it to look.

Figure 6-32: A harsh glare off the surf may be the particular effect that you're hoping to create.

Getting a little wild in the Abstract

Color Efex comes with a set of Abstract filters, which include the following:

- ✦ Infrared
- ✦ Pastel
- ✦ Pop Art
- ✦ Remove Brightness
- ✦ Saturation To Brightness
- ✦ Solarization
- ✦ Stairs
- ✦ Weird Dreams
- ✦ Weird Lines

Most of the Abstract filters are wild in the extreme, but remember that in Photoshop, you can fade the last command and lessen the effects of the filter if you've gone over the top.

Running the Infrared filter on the scene shown in Figure 6-33 makes it look like the atomic bomb tests from the Pacific during the post World War II years.

Figure 6-33: The unfiltered Caribbean neighborhood

The building colors border on garish, and color in the image is saturated beyond belief. To push it a step further, the Stairs filter has been applied to the image in Figure 6-34.

Using the Saturation To Brightness filter allows you to control the brightness of the image and the saturation of the colors. The Nudge Colors slider, shown in Figure 6-35, acts the same as running channel operations in Photoshop. The only difference is that you create the changes as you move the sliders. In image-editing programs, you need a more thorough understanding of how the channels work in order to create these effects.

Figure 6-34: Stairs refers to the "steps" that the filter creates from color changes within the image.

Figure 6-35: The Saturation To Brightness filter window

The Saturation To Brightness effect can be used very successfully in creating a unique look for a catalog or editorial illustration. However, you can achieve similar success with most of the 55 effects available from Color Efex. Exploration is the key to arriving at personal image enhancements within the Color Efex package. You can conceivably waste a lot of time, but it's my personal opinion that this is time well spent because sooner or later you'll want one of these filters and to remember where you found it. All in all, if you can't afford a bag full of glass filters, and still want to use filters on your photos, you can't go wrong with this plug-in.

Optional Products to Make Life Easier

Quite a few pieces of equipment can make your photography more professional. Some cost a little money, some cost a lot, and others you can make yourself.

Gobo

You use a *gobo* to block the light. In an emergency, your hand will do, but I have several different gobos in my studio. Most are made of small, usually circular shaped, pieces of black foam board taped to lengths of wooden dowel or coat hanger wire, as shown in Figure 6-36. They're very useful for knocking back a specular highlight or any kind of glare, and can be held, hung, taped, clamped, or suspended over the stage.
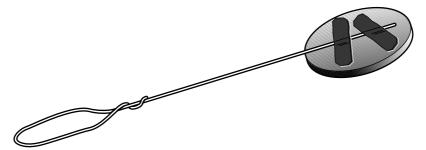
Figure 6-36: Gobos block extraneous light from your shot, preventing unwanted specular highlights or glare.

Rain Protection

If you're going to be doing any shooting that involves water or heavy weather, look into getting a waterproof enclosure for your camera. RTS photo (`www.rtsphoto.com`) carries a line of waterproof housings for all sorts of cameras and video cameras, including what they call the Rain Cape, which is shown in Figure 6-37. The Rain Cape is basically a large bag made of thick plastic/vinyl, but this is different from putting your camera in a baggie or zipper bag. They've installed oversized optical glass front ports that let you shoot right through the rain. The Rain Cape has a connection system that installs in the tripod mount of the camera. It's open at the bottom, so your hands just slip up inside it to operate the controls. This is not a substitute for an underwater housing, so don't even think about it! The Rain Cape keeps your equipment reasonably dry, but it has no protection at all against pressure, and because it's completely open at the bottom, it certainly isn't waterproof. This accessory is more like a really tight-fitting umbrella for your camera and shooting hand.

Quick Release Mounts

If you do a lot of tripod work, then you probably have a quick release mount lying around somewhere. A quick release mount is a means of attaching and detaching the camera from a tripod with as few steps and as little complication as possible. I guess it's because photographers get confused easily by screwing the mounting threads to the camera — is it "righty-tighty or righty-loosey?" Photographers don't get confused so much as they have other things on their minds — such as, is the client going to pay? The quick release, though, gives you one less thing to worry about.

Whereas most quick release mounts simply provide a means to connect the camera to the tripod in a jiffy, the quick release mount shown in figure 6-37 is one of the most versatile on the market today. It's called the Q-top for its shape when viewed from above and a slight angle (and because "Q-tip" was already taken). All you do is screw the "shoe" into the camera's tripod thread to finger tight — by the way, it's "righty-tighty, lefty-loosey" just in case you were still pondering that. Then mount the base to the tripod. The Q-top has a bubble level installed right on top where you can use it to your advantage after you've put it together. Two reducing bushings are used to adapt the Q-top to any possible combination of camera and tripod threads.

Figure 6-37: The Q-top quick release mount has three cams.

Now, simply press a small button on the back with your thumb, and squeeze the larger button in the front with your index finger. This moves one of the three gripping cams toward the center of the mount, and you can slip the camera shoe onto the base. Release the buttons, and the camera is locked firmly in place. To get the camera off in a hurry, just squeeze the buttons together again and lift the camera off the base.

As an added attraction for this little jewel ($108 at www.adorama.com), the shoe has indents at every 30 degrees. Why? Well, if you want to make panoramic shots to stitch together later, just squeeze the mount to release the camera, rotate the camera, and reattach it. When you release the locking buttons, the cams nestle the camera in the slot, leaving you ready for the next shot in the series. On a Nikon 950, the camera has enough room to twist by the shoe, but the shoe must be removed to get at the CompactFlash card.

Wacom tablet

For years, the idea of a digital tablet seemed more of a novelty than a useful tool. But after using one for the last four months or so, I can hardly work without it. Older tablets don't have the flexibility and responsiveness as the new Intuos2 and Graphire2 tablets. As an artist/photographer, the pen is a natural way to work. The only time the pen becomes inconvenient is when I have to do as much type input as drawing. In this case, working with the pen is a matter of constantly putting the pen down and picking it up — in these instances, the mouse or trackball are better tools. Work in the graphic arena (whether with vector or bitmap), however, is ruled by the pen.

The Graphire2 tablets have a working area of 4 x 5 inches, and are priced just under $100. For this price, you get a mouse and a pen with 512 levels of pressure. It comes bundled with Adobe Photoshop Elements and Corel Painter Classic.

The Intuos2 tablets come in sizes from 4 x 5 inches to 12 x 18 inches, and are priced from $200 to $750. The 6 x 8-inch model shown in Figure 6-38 costs about $350, and seems to be large enough for comfortable work, but not so large that it takes up your entire workspace. The 4 x 5-inch and 6 x 9-inch tablets are bundled with a 2-D mouse, Photoshop Elements, and Painter Classic. The 9 x 12-inch, 12 x 12-inch, and 12 x 18-inch tablets only have Painter, but do have a 4-D mouse that has five programmable buttons and a fingerwheel for easy scrolling. The 2-D and 4-D mice only work on the tablets — you can't make the cursor move if they're on a coffee-stained mouse pad next to the computer.
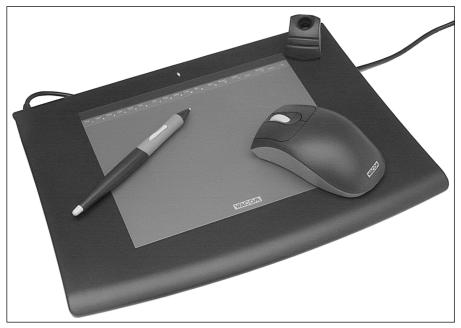
Figure 6-38: The Wacom Intuos2 digital tablet and pen. The mouse only works on the tablet's active surface.
Courtesy of Wacom Technology Corp.

All the Intuos2 pens have 1,024 levels of pressure. The Grip Pen comes standard with all Intuos2 tablets; it features an eraser on the opposite end from the working tip, and a DuoSwitch that allows you to designate one end of the switch for one

modifier key or keyboard shortcut, and the other end of the switch for another command or modifier key. For a more realistic feel when working with the Wacom tablets, you can purchase additional pens. The pens come in five variations; some are more decorative, such as the Classic pen ($50); and others are more functional. The Stroke Pen has a flexible tip that gives the pen a brush-like feel as it's drawn across the tablet. It doesn't have an eraser or DuoSwitch. The Inking Pen doesn't have an eraser or DuoSwitch, but enables you to write or draw with ink. The Inking and Brush pens are $80 each. A $100 Designer Pen is made from brushed metal in the same shape as the Grip Pen, but lacks the eraser. Finally, the Airbrush has the control and feel of a traditional airbrush right down to the top-mounted fingerwheel for ink flow. It also has a pressure-sensitive tip and eraser and a programmable button, for about $100.

penPalette

At this point in the chapter, I've convinced you to get a Wacom tablet and a nik Color Efex Pro plug-in. How about having the flexibility and creativity of those filters flowing out of your digital pen? Well, nik has introduced the $99 penPalette to do just that.

The penPalette works on Macs (from 8.6 through OS X) and PCs (from Windows 95 through XP), in Photoshop 5.5 and up, and Photoshop Elements. The software is extremely versatile because you can now *selectively* retouch specific areas of an image while leaving the rest of it alone. The plug-in comes with eight photo-retouching filters:

- ✦ Warm Tone
- ✦ Cool Tone
- ✦ Contrast
- ✦ Colorize
- ✦ Add Noise
- ✦ Despeckle
- ✦ Soften
- ✦ Contrast Only

With the Wacom pen, you can paint or brush, erase, clear, or globally fill with the filter you've selected — in the area you need it. More good news: You can add the other nik Color Efex Pro filters to penPalette if you already own them. Better yet, you can install nik Sharpener Pro so that some areas of the image can be sharp and others soft for special effects.

You can set the pen's pressure sensitivity to determine brush size or the strength of the effect. Any Photoshop tool or brush works with penPalette, too, so you can

make soft airbrush edges or keep them sharp and crisp. All pen functions, including tilt and airbrush wheel, are operative. What if you don't have a Wacom tablet? Good news. The plug-in works with trackballs and mice as well as the tablets, but naturally, you lose the digital tablet controls.

This all may sound silly. After all, you can accomplish all of this by creating a mask or two, or a few adjustment layers, and then working Hue and Adjustment, Brightness/Contrast, and change a few blending modes. Sometimes you also have to use Undo or Revert because things just didn't work out as you planned. However, doesn't it seem a lot easier to just select and paint? The program does all the work in the background. When you finally click the Apply button, all the layers are flattened, and the alpha channels are trashed, leaving your image looking like a million bucks. Oh, and if you think you may have gone just a tad too far, you can always choose Edit ⇨ Fade, and kick it back a couple notches.

For example, look at Figure 6-39, which shows the root system of some tropical trees. At the time, I thought it was interesting just for the texture and tangle of nature crawling along the ground. Later, it became just another shot that I wouldn't show to anyone. Other than increasing contrast and playing with Curves, I couldn't do much to the photo, and it was still a very ho-hum picture.

Figure 6-39: Tangled Caribbean tree roots lacking direction in nature and in photographic style

However, when I went to Filters ⇨ Automate ⇨ penPalette, the photo began to take on a new life. The floating palette that appears contains eight fully functional filters in the top section. Immediately below these are more filters that start life as demos. If you have one of the other Efex sets (Artistic, Classic, Sharpener Pro, and so forth), then you can click the Settings button to add the larger set to this palette. Only a dozen show in the palette, but the More button contains a flyout menu that displays all your filters. I selected the Midnight (blue) filter, and instead of painting the entire image, I chose Fill in the Editing Functions section. This ran the filter over the entire image. Then I clicked the Erase button, set a large, soft brush, and selectively erased a portion of the filtered image. I then repeated the process with the Soft filter. To make the brighter area more interesting, I then chose the Sharpener Pro button and selectively sharpened key areas in the picture, as shown in Figure 6-40. These actions took less than five minutes, and turned a lifeless image into one with at least a little mystery.

Figure 6-40: A dead photo brought to life

You can use the penPalette in other ways, too. If you want to make hand-tinted black and white photos, this tool combination is a natural for you. By clicking on the Colorize button, you can choose the color you want and apply it selectively with a natural feel. You can use the Soft filter to blur backgrounds down so that the foreground features really pop.

Summary

This chapter explained the real cost of working with digital cameras, especially cameras of the prosumer variety. To put it another way, this chapter is a compendium of the accessories that you're most likely to need in order to get specific types of jobs done. You've also been exposed to some really nifty tools and software — if you suffer from techno-envy as I do, you're about to spend some money.

✦   ✦   ✦

Outfitting Your Computer

In order to set up to shoot and produce the best possible traditional photos, choosing darkroom equipment most suitable to your goals is of paramount importance. In digital photography, choosing and setting up the computer and software that compose your digital darkroom is no less important.

Operating System: Windows or Mac?

The vast majority of operating systems that are used for working with digital photography run under either the Windows or Macintosh operating systems. Windows runs the great majority of desktop computers (most experts peg this figure at over 90 percent). However, the number of computers running the de facto standard in image-editing applications, such as Adobe Photoshop, is almost evenly divided between the two operating systems with the balance slowly tipping towards Windows. Lots of people will argue that one or the other of these platforms is vastly better than the other. The fact is, however, that your decision regarding which platform to use is most likely to be based on which platform you're *already* using. It is simply much easier to use what you already know than to learn a whole new system.

Currently, however, deciding between operating systems is a tough task because neither operating system offers a huge advantage over the other unless you have very specific needs. For example, suppose that you are preparing images that are destined for a service bureau or advertising agency that will be used to carry out a job. In this scenario, the Mac has a clear installed-base advantage. By tradition, a vast number of pre-press people are more thoroughly acquainted with the tools, file formats, and font and color standards for the Mac than they are with similar items for Windows, which have only

begun to emerge and mature over the last two years. Furthermore, the Mac preju-
dice of the pre-press world is unlikely to change over the next several years.

Both platforms offer specific advantages and disadvantages. As a matter of fact, I
own and use both platforms. When people ask me which one I prefer, I tell them it
depends on which machine crashed last. This doesn't mean that you don't have
good reasons why one of the two operating systems is more important to you. None
of these reasons involve Photoshop, however, which is nearly indistinguishable in
operation from one platform to the other, provided that both are similarly
equipped.

However, if you haven't already purchased a computer, you may want to consider
which platform is most prevalent among your friends, colleagues, and clients. The
answer will vary considerably from clan to clan, neighborhood to neighborhood,
and corporation to corporation. The more people you have around you using the
same computer, the more support you can get and the more you'll learn from one
another's experiences.

After you take into account the system you already have and the system that most
of your peers are using, you will be ready to decide on a computer. If you're about
to upgrade and don't mind changing operating systems, or if you're buying a com-
puter for the first time and just want it to be as photographically capable as possi-
ble, you may have more flexibility in making your final decision. In any case, choose
your computer with the following considerations in mind:

✦ It should give you the most choice in software tools pertinent to your interest
  in digital photography.

✦ It should make it easy for you to transfer files between collaborators, clients,
  and service bureaus.

✦ It should make it easy to get support and advice from those most likely to pro-
  vide it quickly and at no cost.

Ease of use and price are often quoted as the reasons why you should decide on
one particular computer over another; however, neither of these is a good reason
on its own. Ease of use is more dependent on the application that you are working
with than on the characteristics of the computer's operating system. Think about it:
You spend much more time working within an application than starting up your
computer and opening a file. Additionally, ease of use is often a trade-off with power
and flexibility. These days, both platforms use WYSIWYG (what you see is what you
get) operating environments that borrow heavily from each other. The "borrowing"
isn't as one-sided as many Mac zealots would have you believe, either.

What about price? Well, it's not nearly as important as productivity. Time will always
cost you much more money than hardware—unless you insist on staying on the
very cutting edge. Remember that price depends on economies of scale. The latest
generation of any technology will probably cost you twice as much as the previous
generation, but the performance boost you get for your money is only about 20 or

30 percent. The smart buyer will be on the lookout for the "more bang for the buck" factor. Having stated all that, however, Windows computers will generally cost you significantly less. It's just a matter of competition and economies of scale.

On the other hand, you may want to use applications that are only available on one platform or another. Live Picture, which many pros still find highly useful for *compositing* (making a picture from multiple images), is only available for the Macintosh and no publisher is currently selling or updating it. Finally, digital video-editing software and hardware are considered more readily available for Wintel computers.

Speed

If you plan to work with the full array of professional image-editing features on files that are much larger than 18MB, your computer should be as fast as you can afford. An 18MB file (uncompressed) is about the minimum size for a high quality 8 x 10-inch print. By today's standards, most professionals and serious image editors consider a 1 GHz Windows PC or a 450 MHz Mac to be the minimum requirement — and faster is always better. On the other hand, professionals have managed quite nicely with computers running at less than half that speed for years.

Working with digital photography will quickly teach you the importance of having a fast computer. I'm not just preaching the old "time is money" saw — although that's certainly an important factor. The simple fact of the matter is that waiting for the computer — even for a few seconds — is just plain annoying when you're being bombarded by creative impulses that you want to experiment with. In addition to having a fast CPU, you also want a CPU that supports high-speed data transfer and has the fastest possible graphics processor. A CPU that has a built-in graphics instruction processing set is another important asset.

Caution   The very fastest CPUs generally sell for a price that's disproportionate to the added performance that they provide.

How fast is fast?

Let's face it: Manipulating images in graphics applications involves massive amounts of data — especially when compared to the amount of data that gets manipulated in office applications For example, a year's worth of legal documents for a good-sized law firm will fit into the same amount of disk space that's required for one high-quality advertising photo. Even if you use the computers that are three to four times faster than was typical when the previous edition of this book was written, you will still be able to make a phone call or go to the kitchen for a cup of coffee while some filters are creating a special effect on a high resolution photo. Therefore, you want to buy all the speed you can reasonably afford in the area of *photomanipulation*. If you have viable expectations of making a living in digital photography, you probably can't spend too much on making your computer faster (or on buying a faster computer).

Don't judge the speed of your computer entirely by the speed of your processor. The speed of the *system bus* (the printed-circuit "wiring" that links the various computer components together), hard-drives (shoot for 7200 rpm), peripheral interfaces (FireWire, USB 2, and SCSI are the fastest), and the performance of your graphics card will all make significant contributions to the overall speed of the machine. Finally, the more RAM (random access memory or system memory) you have installed, the faster your computer will be able to complete complex operations and the more tasks you'll be able to handle at once. Don't forget, the more tasks that you can perform at one time, the faster you'll be.

How much and what kind of memory?

If you're just starting out and mostly working with snapshots, if most of your image-making is for the Web, or if your camera's images are less than 2 megapixel resolution, then 256 to 512MB of RAM should be plenty for you. Your ambitions will almost surely grow as your fascination with this medium grows, so it's more important to make sure that your computer has the capacity to grow into 1 or 2GB of RAM.

Recommending a good RAM configuration for a computer used to be easy because most people followed the "more is better" rule—especially for digital photography. This reasoning was natural because your choices used to be limited to the amount of RAM that was compatible with your computer. Of course, compatibility is still a requirement, but newer types of RAM are also much faster, partly because of their design and partly because they run on faster system buses (currently around 166 MHz, but always moving upward). New types of RAM are now being introduced about as often as new digital cameras. You can find out the specifications for the latest and fastest RAM specifications on the Web at
`www4.tomshardware.com/mainboard/`.

How much and what type of disk storage space?

As long as you have at least 10GB of *free* disk space, you should be able to get by—unless your business is primarily centered on dealing with photography. In that case, take heart in the fact that you can buy 60GB, 7200 rpm hard drives (which are significantly faster than 5400 rpm hard drives and better suited to video-editing applications) for a hundred dollars these days. For the really hard-core photo businesses, 180GB FireWire or (RSN) USB 2.0 hard drives cost around $300 each. You'll also benefit from various forms of removable and portable hard drives—especially if you're going to travel or do video.

The real revolution, however, is in CD-R (recordable) and CD-RW (rewritable) drives. They allow you to continually archive and store your photographs. In the process, you get to continually recycle space on your computer's hard drives.

Most new computer models come with internal CD-RW drives or combination DVD Playback/CD-RW drives. Today, you can expect to get the most speed for your money from those that run at 12 to 24 times the normal CD recording speed. CD-RW recordings usually run at about 20 percent slower than when a record-only drive is used.

Managing Your System's Memory

Your computer system's memory is divided into RAM (random access memory) and disk storage. You can find most of what you need to know about RAM requirements for digital photography in the system requirements section of the user manual that accompanies your image-processing software. If you just want to get the job done and you're not hoping to create extremely high-resolution images for advertising or fine art purposes, you can get by with the minimum requirements. You should know a few things about memory that are unique to the platform you'll be working on, and you should also know some ways that you can maximize the performance of RAM and hard-drive space. I discuss both of these in the following sections.

Note The one thing you should never forget when you're considering serious digital imaging is that you can never have too much memory—either RAM or hard-drive space, and you can never have a computer that is too fast.

Windows

Windows doesn't require that you allocate a specific amount of memory to any application before you run it. If your image is too large to fit into the available RAM, Windows automatically uses virtual memory. The amount of virtual memory that you have depends on the size of the swap disk that you allocate when you set up your system. You can reserve disk space so that you always have a minimum amount of virtual memory, but Windows will automatically use any additional disk space that's available.

Macintosh

Macintosh users using OS versions preceding OS X need to allocate memory to each application. This becomes especially important for applications that handle photographs because the bitmapped files tend to be quite a bit larger than most of the other data created by other types of applications. Only video and animation are more demanding of memory. The documentation accompanying your Macintosh application will almost always tell you how much memory should be allocated. If you plan to run several applications simultaneously, make sure that the total amount of required memory doesn't exceed the total amount of RAM.

Tip   If you're using Photoshop (and many other imaging applications) it's best to turn off the Macintosh virtual memory. Otherwise, Photoshop's built-in virtual memory may conflict and cause your system to crash.

RAM

In addition to the requirements set by your application program and the amount of RAM used by your operating system, you will need about three times as much RAM as the largest image that you plan to process. For Windows users, this is only true as far as your limit for maximum performance is concerned. For Macintosh users, this rule comes closer to being the law.

The more RAM you have, the faster your system will be — even if the RAM is not required by the applications that you are running. This is because RAM is very fast compared to hard drive access. The more the computer can do in RAM, the less it needs to rely on accessing instructions from the hard drive.

Disk storage

The most important thing you need to know about disk storage is that you will never own a large enough hard disk. Images fill them up before you can say "Jack Sprat could eat no fat." Fortunately, prices for hard drives have fallen to the point that you can buy several gigabytes for a couple of hundred dollars. SCSI drives (used by most Macs) can cost up to twice as much as IDE drives. If you plan to do digital video as well as digital still photography, you should invest in SCSI drives because they are considerably faster.

Finally, removable hard drives (such as the ubiquitous Iomega Zip and Jaz drives) and compact disk recorders are excellent investments if you will be doing digital imaging.

Removable hard drives let you offload projects by type or by client, thus enabling you to move images from one computer to another or transport images to service bureaus and clients. For this purpose, you will want to choose drives that are most likely to be owned by others, so I strongly recommend the Iomega products.

Compact disc recorders provide a very inexpensive and universally portable means of storing large amounts of data. Images can be stored in ISO 9660 format, which can be read by virtually any computer. Recordable discs sell for as little as thirty cents each and hold 700MB of data. Look for a recorder that records at 12 or more times the normal data rate, which will allow you to record an entire disc in just over 15 minutes.

A subspecies of CD recorders called CD-RW (for ReWritable) have completely replaced write-once only drives, but these drives will still write to write-once disks. Re-recordable CD media cost about four times as much as write-once media, but it's cheaper on a cost-per-megabyte basis as compared to other types of removable, rewritable media.

Choosing a Display Card

Five primary considerations determine which display card you use:

✦ **True color image:** The capability to display a true color (16.8 million colors) image is crucial because without it, you simply won't be able to edit color accurately.

✦ **APG compatible:** A card that can run in the AGP (Accelerated Graphics Port) of your computer is useful because, if you have one, an AGP slot is a cost-free way to assure yourself of speedier display performance.

✦ **Extra video RAM on the card:** Having extra video RAM on the display card is essential to preserving system speed. Some cards share system RAM, which works to produce more colors, but the card has to work through a slower system bus and steals some RAM (usually 16 to 32MB) from your other computer operations.

✦ **High resolution:** The capability to display at a resolution of at least 1024 x 768 pixels is important because this is the minimum practical size display that will allow you to see all of the Options Bar in Adobe Photoshop 6 and later versions. A larger display size is always preferable because most image-editing programs use a fair amount of screen space for various interface components, such as layers, palettes, and toolbars. However, you want to be able to see as much of the image at once as possible in order to be able to judge the effect of an edit, brush stroke, or special-effect filter on the overall image.

✦ **Speed:** Speed is of utmost importance to those who want to (or must) work with large, high-resolution images. If you often work with files of more than 20MB or if you do production work on hundreds of images a day—regardless of size—then cards that are made especially for high-speed rendering will make a valuable contribution to the overall speed at which you can get your work done.

Note   Many who work with digital photographs are also involved in digital video. If that's the case for you, you'll want to be sure that your video card includes MPEG support.

Setting Up Your Display Card

Because you are working with photographs, deciding which resolution and color mode to use is a relatively easy matter. You want to view your color photographs in a neutral setting with as little glare as possible. Furthermore, you want to avoid arty backgrounds, screen savers, and all that other "cute stuff"—at least while you're editing your pictures. Editing photos in anything other than a neutral-color environment makes it impossible to accurately judge color values in your photos. Then you can go back to your favorite wallpaper when you're only using Quicken and e-mail.

Macintosh

For the most part, the Macintosh default settings are the best ones for working with photographs. Use the following steps to set up your display card:

1. **Go to Control Panels and choose Monitors & Sound.**

2. **When the Monitors & Sound control panel opens choose the Monitor icon.**

   Under Mac OS 9, this appears as the Monitors Control Panel.

3. **In the Color Depth panel, click the Colors radio button and choose Millions from the Color palette.**

   If you're on a budget and can't afford a high-performance display card that supports true color, you can limp along by choosing Thousands.

4. **In the Resolution panel, choose the Recommended from the Show pull-down menu, and then choose the resolution for your monitor that gives you readable type at the highest resolution that your card will support.**

5. **In the ColorSync Profile panel, choose the profile that you set with your color calibrator.**

   If you press the Calibrate button, you can perform a calibration with steps that are nearly identical to the Photoshop Gamma calibration.

6. **Close the window.**

Windows

The default Windows Monitors and Sound settings tend to be a bit more "colorful" than the Macintosh. Furthermore, Windows offers many opportunities to use wallpaper, screen savers, and truly garish color schemes. Therefore, it's even more important for Windows users to use a neutral background so that they can be colorful accurately.

Use the following steps to set up your display card:

1. **Place the cursor on an empty space on the desktop and right-click. A contextual menu appears.**

2. **Choose Properties from the contextual menu. The Display Properties dialog box appears.**

3. **Click the Appearance tab, as shown in Figure 7-1.**

4. **From the Color Scheme pull-down menu, choose Silver.**

5. **From the Windows and Buttons menu, choose Windows XP style.**
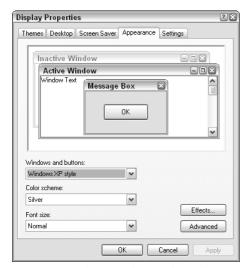
Figure 7-1: Choose Silver and Windows XP style in the Display Properties dialog box.

After you've set up a color scheme that you can work with, you want to make sure that you're working in true color (all 16.8 million colors and shades visible to the human eye) and at the highest resolution consistent with readability. Don't give up true color in favor of resolution, or all of your calibration efforts will have been in vain. Also, if you have enough memory, your display card may enable you to choose 32-bit depth for true color. This is a good choice if you have a camera or scanner that captures 32-bit information. However, whether you can actually manipulate the digital image at that resolution depends on the software you use and on the settings you have made in that software.

I make this recommendation for highest resolution strictly on the basis of editing photographs. In desktop publishing/graphic design applications, it's important that type be as close as possible to the same size as it will be on paper. If you constantly have to switch between desktop publishing applications and photo manipulation, you'll want to use the resolution that gets you closest to 72 dpi on your screen. The Table 7-1 provides guidelines for achieving 72 dpi.

Table 7-1 Settings Used to Achieve 72 dpi	
Screen Size	**Resolution Closest to 72 dpi**
12-14 inches	640 x 480
15-17 inches	800 x 600
19 inches	1,024 x 768
20-21 inches	1,280 x 1,024

Here are the steps you need to take to set screen resolution and the number of colors you can see:

1. **If you don't still have the Display Properties dialog box in front of you, select Settings ⇨ Display from the Start menu.**

   When the Display dialog box appears, click the Settings tab, as shown in Figure 7-2.
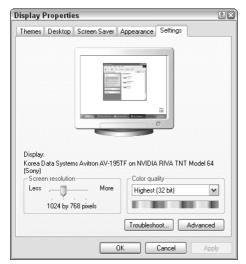
Figure 7-2: The Display Properties dialog box as it appears when you choose the Settings tab

2. **From the Color Quality pull-down menu, choose Highest (32-bit if your card enables it).**

3. **Drag the Screen Resolution slider to the screen resolution that you prefer (see the suggestions on resolution that precede these steps).**

You have now ensured that your display card is performing to your best advantage for working with digital photographs. These settings should work for almost everything else you do (they certainly do for me), but if you need or want another set of settings for another purpose, be sure to repeat these steps before editing photographs.

Choosing Monitors

Choosing a workable monitor is a straightforward matter for snapshooters and those dabbling with the idea of working in digital photography. Just about any color monitor capable of displaying true color will do. (Refer to the section in this chapter about setting up your display for more information.) However, if you're going to buy a new monitor, which are sold for reasonable prices these days, consider the following:

✦ **CRT versus LCD — which is better?** CRTs — the traditional, tube-type monitors — are gradually being replaced by slim, lightweight LCD (liquid crystal display) monitors, the type that you see on laptop monitors. LCDs are easier on the eyes, show much less distortion, and display approximately the same amount of information as the next size up in CRT tubes. For example, a 15-inch LCD can display almost as much information as a 17-inch CRT. However, LCDs can rarely be calibrated with as much precision as CRTs and are significantly more expensive than CRTs. If you're serious about accurate color previewing, then stick with CRTs for editing your photos. However, sometimes you don't have a choice, such as when you're traveling. If you do have a choice, use your LCD as the menu screen and your CRT as the editing screen in a dual monitor setup (a single ATI Radeon card can support both).

✦ **Bigger is better:** When editing high resolution photographs, there's no such thing as a monitor screen that's too large — unless it's so big that your desktop won't support it or your wallet isn't fat enough to support it.

✦ **Flatter is better:** Flat screen CRTs will give you a much better sense of how your picture will look when printed on a flat piece of paper. They also have less distortion and have fewer surface reflections, which make them much easier on your eyes.

✦ **Higher refresh rates are better:** A refresh rate of anything over 72 MHz is highly desirable because screen flicker is reduced to the point that it is nearly imperceptible. This means that your eyes don't tire nearly as fast.

✦ **Smaller dot pitch is better:** The smaller the number for dot pitch given in the monitor's specifications, the less chance that the colors from individual pixels will overlap and contaminate one another. So you'll be better able to judge image sharpness and detail.

✦ **Higher maximum resolution is better:** The higher the maximum resolution your monitor is capable of displaying, the more flexibility you'll have in determining how much of the screen needs to be devoted to the image and how much to the user interface. In other words, higher resolution makes your monitor function as a bigger monitor. Of course, if you have poor eyesight, you may have a hard time distinguishing small details.

✦ **Single-gun aperture grill tube (Trinitron, Mitsubishi) is better:** Monitors that use a single-beam electron gun and a shadow mask (regularly-spaced vertical wires), produce a sharper, higher-contrast, and purer image that is significantly better for judging image quality and color.

Choosing a monitor is a primary consideration for those who are serious about digital photography. Be willing to spend more in order to max out all of the considerations in the previous list.

Flat-screen monitors from Sony, Mitsubishi, NEC, and Radius were beginning to appear at very reasonable prices at the time of this writing. Flat screens have been with us for a while in smaller sizes at higher prices, but the new models sell for nearly the same price as curved-screen monitors, and they are even more distortion- and glare-free. Several of these monitors also have USB connections and USB ports located at the front of the monitor, which can be very handy for viewing digital camera photos while they are still in the camera. This provides an excellent way to "proof" digital photos during a studio shoot.

Dual Monitor Capability

The best way to gain extra screen space so that you can see as much of the image as possible is by investing in a dual-monitor setup. Some display cards for both Windows and Macintosh, most notably the ATI Radeon series, make it possible to run two monitors from the same card. This is an advantage because you save a couple of hundred dollars by not having to buy a second card. These cards are also easier to configure for Windows XP and Mac OS X. Finally, running both cards from one card ensures that the color signals sent to both monitors from the graphics card will be identical.

Adjusting Your Monitor

This section will help you to adjust your monitor for the least distorted image possible, given your monitor. If at all possible, choose a monitor with Trinitron technology; many companies make such monitors. Some, such as Radius (Miro), sell excellent-quality Trinitrons at extremely reasonable prices. I don't make this recommendation because other monitors don't have excellent qualities, but because Trinitrons (and their close cousins, the Mitsubishi DiamonTrons) have a couple of characteristics that make them especially well suited to editing graphics and, particularly, editing photographs:

✦ The tubes are vertically flat, which results in fewer surface reflections and less linear distortion in the image.

✦ These monitors use a single scanning gun to produce all three primary colors. As a result, it is much easier to judge colors because there is no chance of dot misregistration. Most important, all the color calibrators recognize Trinitron phosphor color.

Hardware adjustments

Your monitor may have either analog or digital controls. Some even have analog controls for brightness and contrast, and digital controls for horizontal and vertical size, horizontal and vertical position, and keystoning and pincushion distortion.

Brightness and contrast

If you own Photoshop, use Adobe Gamma. You can also load the color and grayscale target found on the CD-ROM that accompanies this book. Turn contrast all the way up, and then adjust brightness until black is solid black and white is a bright, clean white. Now adjust the brightness so that you see exactly ten distinct shades of gray in the target.

If you are calibrating with Adobe Gamma or any other calibration software, don't readjust the brightness or contrast control for the rest of the procedure. Adobe Gamma's Wizard will guide you through the steps necessary to complete the procedure. If you need to readjust brightness and contrast for some other reason, be sure to rerun Adobe Gamma or whatever other calibration system you might use.

Horizontal and vertical size

Use this adjustment to size the image so that it is as large as possible without being cut off by the monitor mask. Be careful not to cut off the edges; you may find yourself cutting off important information in menus and status lines that border your workspace. See Figure 7-3 for an idea of how properly adjusted vertical and horizontal sizes should look.

Horizontal and vertical position

Horizontal and vertical position (shift) control moves the screen image from top to bottom and side to side so that you can center the image onscreen. This setting is illustrated in Figure 7-4.
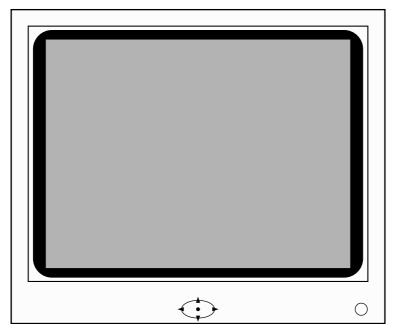
Figure 7-3: Properly adjusted vertical and horizontal size
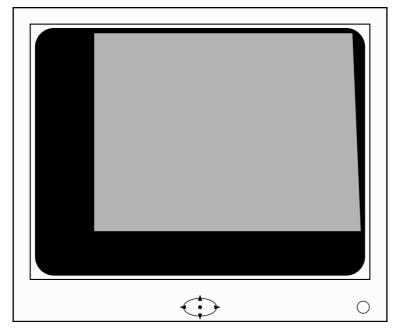
Figure 7-4: In this case, the image needs to be shifted both vertically and horizontally in order to be centered on the screen.

Keystoning

The keystone adjustments expand the top or bottom dimensions of the display equidistantly, either by bringing the corners closer together or by spreading them apart. Keystone and pincushion distortion are often combined. Figure 7-5 shows keystone distortion in which the length of the bottom of the display is shorter than the length of the top of the display.
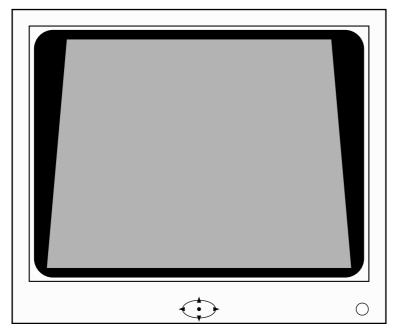
Figure 7-5: Exaggerated keystone distortion

Pincushion distortion

Pincushion distortion makes an image look as if it were projected onto a sphere, as shown in Figure 7-6. Pincushion distortion makes the display seem to bulge. The effect is usually more exaggerated on the sides of the display.

Barrel distortion

Barrel distortion makes the sides of the image look bloated, as shown in Figure 7-7.
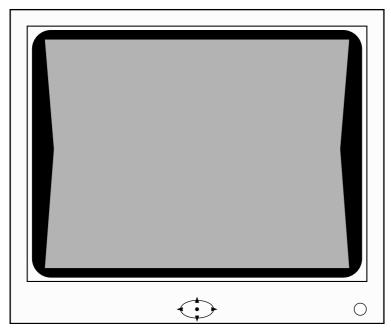
Figure 7-6: Pincushion distortion
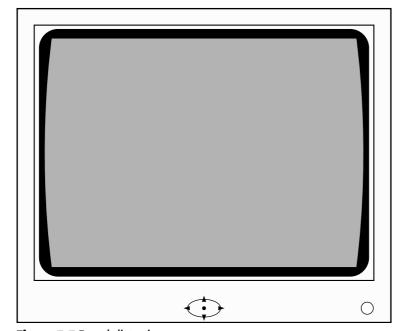
Figure 7-7 Barrel distortion

Note Another type of distortion, called *corner pincushion distortion,* can be adjusted on some monitors. Corner pincushion distortion causes the corners of the display seem to shrink or blossom.

Making a monitor hood

A good monitor hood will go a long way toward making your monitor's color more predictable, which is why you see them on so many high-end calibration systems. Another bonus is that they cut glare and, therefore, eyestrain. You can pay a fair amount of money for a prebuilt monitor baffle or you can make your own for a few dollars and an hour or so of your time. If you have several monitors, you can make baffles for all of them at the same time, which allows you to cut your costs and time investment even more. Here is how to make a monitor hood:

1. **Go to an art supply store and buy some large pieces of foam core mounting board.**

   It should be coated black on both sides, but one side will do.

2. **Measure the top and sides of your monitor(s) at their widest point.**

3. **Cut three strips approximately 10 inches wide.**

   One strip should be as long as the widest point of the top of the monitor case. The other two strips should be as long as the widest point of the sides of the monitor case.

4. **Use black tape to hinge the inside (black side) of the baffle.**

5. **Fold the baffle in and tape the outside hinges.**

6. **An optional step is to cover both sides of the baffle with an even less-reflective surface.**

   You can use adhesive spray to attach 50 percent gray paper to the outside of the baffle and a felt-flocked black paper to the inside.

7. **Place the baffle on the top of the monitor, and tape it down with black masking tape.**

Calibrating Your System

Printed material and your digital input and viewing devices (cameras, scanners, and monitors) use entirely different means of representing color. Printed materials represent color by mixing primary colors together to form darker, more saturated color. Because printed materials can't produce a true black that way, printed materials also have to add black pigment.

Cameras, scanners, and monitors represent color by subtracting primary colors from pure white light. Black is simply the absence of light. Technically, there's no way to make a perfect match between what you see on a monitor by transmitted light and what you see on paper by light reflected off its surface. Thankfully, however, you can come "close enough."

Of course, how close is "close enough" depends on the requirements of your business, your budget, and your personal preference. The following sections explore your options, and I explain them by starting with the simplest techniques and graduating to the costliest and most elaborate. Of course, the latter will come close to meeting even the most demanding prepress requirements.

Tip   Make sure you haven't installed the software for two color calibrators at the same time. They will conflict with each other and throw your color printing off. This happens most frequently when an application asks you to set up for color. If you are already using another calibrator, just say no. This also holds true for calibration methods built into the operating system, like ColorSync on Mac OS.

The test-chart method

Regardless of any other methods that you currently use or use after reading this chapter, you should start with this one. The following methods are mostly concerned with calibrating.

Start with a test print that has a ten-step gray scale, a color chart, and a full-range photograph on it. You can buy these from print shops and professional photography stores. If you use Photoshop, you can also print out the Adobe file called `Test Image`, which can be found on the Photoshop CD and use it in the same way. It's a good idea to have several identical copies of the test print so you can have it handy for testing when you get a new camera or new film, when you compare a scan, or when you're calibrating your printer after a change of software or when testing new inks and papers.

After you have the chart, take the following steps to calibrate your camera:

1. **Start by calibrating your monitor by using one of the methods listed below.**

   You will have to judge the performance of your digital camera or scanner by what you see on your monitor.

2. **Take pictures of the chart under controlled lighting conditions:**
   - You need to know the color temperature of the lighting and make sure that the print is evenly illuminated.
   - If you are going to be scanning your images, shoot with a film camera and use the type(s) of film you will be putting through any scanners that you plan to use. If you have a digital camera, be sure to use that, too.

- Take all the pictures under identical lighting conditions, but bracket your exposures a full stop on either side of the indicated reading. Be sure to bracket in half-stop increments. Note the exposure for each frame.

- If possible, take your reading with an external incident light meter held at the same plane as the test print. If you are stuck with the meter in your camera, aim it at a photographer's gray card. You can buy a Kodak gray card at any professional photography store.

3. **Choose the slide, print, and/or digital photo that looks best without making any processing adjustments.**

- Make a note of which film emulsion or digital camera was used and at what exposure.

- Also note how much, if at all, the exposure value of the chosen image differs from the exposure recommended by your meter.

- From now on, you will want to set your camera to compensate exposure by the same degree (at least as a starting point). You have now calibrated your camera.

Now you follow a similar procedure for your scanner, monitor, and printer — in that order.

1. **Scan the image that you photographed on conventional film with your scanner.**

The image should also have been printed conventionally if you're testing a flatbed scanner. Every scanner's software is different, but almost all offer some way to balance red, blue, and green settings and to change brightness and contrast.

2. **Make adjustments until the scanned image looks like your test print.**

If possible, save the settings so that you can recall them any time you make a scan.

3. **Print the image on your color printer.**

Your color printer may have an ICC (International Color Consortium) profile that Photoshop can read, but it won't matter unless you stick with the same inks and papers. Ask your printer manufacturer for as complete a list as possible of profiles for your printer and different ink and paper combinations. Some folks prefer not to work with ICC profiles, in which case, you'll have to make a manual match. When you've managed to get these adjustments perfect, just save the adjustments. Most printer software will let you save a settings file under a name that you find useful.

Whatever you do, don't use the image adjustments in your image-processing program. Make the adjustments by using your printer software. You make these differently in the software for each brand, and sometime each model, of printer. You can see some of the basic adjustments for the Epson Photo 1270 printer in Figure 7-8. The Epson Photo 1270 lets you adjust brightness, contrast, and the level of each color. You can also choose a paper type that is closest in characteristics to the actual paper you will be using. You can then save the settings to a unique filename that can be used again.

At this point, you should be pretty close to having a system that will produce more consistent results from shutter click to final print than if you just leave everything to chance.
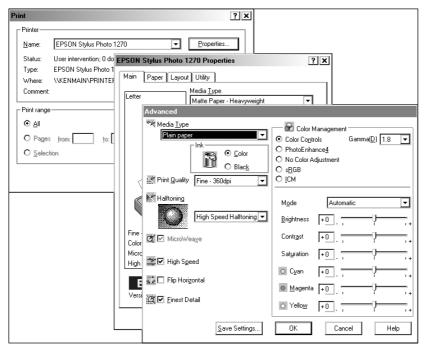
Figure 7-8: The Epson Photo 1270 lets you choose from a wide range of color and brightness adjustments.

Note   Some people will tell you that you should scan in CMYK. This advice holds if you are scanning strictly for prepress final output and you have a very high-end drum scanner, such as the Crossfield, which actually scans in CMYK. Almost all other scanners, if set for CMYK scanning, actually scan in RGB and then make their own CMYK conversion. You can do a better job in Photoshop. Furthermore, many of the

commands in Photoshop (and most other image-processing programs) are disabled when you're working on a CMYK image. Therefore, it's better to work in RGB and convert to CMYK only when you're actually ready to go to press. If you're still resistant to that idea, consider the fact that you will probably want to use your images in several different media, some of which are RGB media (the Web, for example). If you start with CMYK, you won't have as rich an image when you convert back to RGB.

Calibrating your monitor

There's no doubt that in digital photography, as is the case with other digital graphics applications, calibrating your monitor is at the center of success in producing predictable results. In a sense, your monitor is your light table, where you examine the results of a shooting session. It's also the medium by which you judge any sort of interpretative changes in an image.

How much better (more accurate) you want your monitor calibration to be depends largely on your budget. All of the methods that I discuss here are much better than leaving it to chance. Having said that, though, I have to tell you that I have a neighbor, excellent at prepress work, who says that she trusts her eyeballs to calibrate a monitor more than she trusts any of the technologies that she has seen. Few of us, however, have her experience. So unless you fall into her category, read on.

Before calibrating your monitor, you should take a few preparatory steps:

✦ Make sure your monitor has been turned on for at least half an hour before you start calibrating. Phosphors change color during the first 30 minutes and stay much steadier after that. By the way, this is a good reason to leave your monitor turned on during your working hours.

✦ Degauss the monitor, if that's possible. Some monitors don't have degauss buttons, which may be a good reason to buy another monitor.

✦ Clean your monitor's faceplate. If you use a glass cleaner (a good idea, unless your monitor has a plastic coating) be sure to spray it on the cleaning towel and not on the monitor, which can cause a short.

✦ Some monitors have a color balance control. If yours has this feature, put your test picture on the screen and adjust the color balance until you find it pleasing. If you ever change this control, you will need to recalibrate your monitor.

✦ If your monitor has a color temperature switch, set the color temperature to 5,000K. If your calibration software asks for the color temperature of your monitor, just enter this figure.

Using Adobe Gamma

Many image-processing programs offer some method that enables you to adjust your monitor's controls for the best possible settings. Adobe Gamma is a control panel applet that comes with Adobe Photoshop and is used for adjusting monitor gamma. In Windows NT and 95, it works only in conjunction with Photoshop. In Windows 98, it is a control panel for the entire system — as is the case for the Macintosh. The same is true of all software-based monitor calibration systems. In fact, this is one reason why the Macintosh still holds the lead among graphics professionals.

To start Adobe Gamma, you must first install Adobe Photoshop. You then go to the operating system's Control Panel menu. On the Macintosh, you will find this on the Apple menu. In Windows, choose Start ⇨ Settings ⇨ Control Panel. When the Control Panel menu or window opens, choose Adobe Gamma. From here on out, operations are pretty much the same for either platform. The first thing you see is the Adobe Gamma Wizard, which is shown in Figure 7-9.
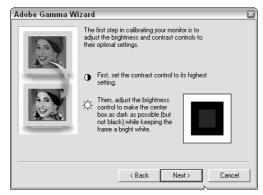
Figure 7-9: In Adobe Gamma, you can use the control panel or a wizard to perform this simple procedure.

You can choose either the wizard or the control panel. You can do a better job with the control panel because you can set your brightness and contrast controls properly and you can control the gamma of each electron gun. First, make sure that the lighting level is consistent with your usual working conditions. If you work at home, you'll probably want to create one profile for daytime and another profile for after dark. Also, it's a good idea to put a light baffle around your monitor. (See the section "Making a Monitor Hood" earlier in this chapter.) Then, perform the following steps:

1. After choosing the Control Panel option, the control panel appears. At the top of the control panel is a bar called Brightness and Contrast. Adjust your brightness and contrast controls so that the lower bar stays a bright white, while the upper bar turns a solid black.

2. Located beneath the Brightness and Contrast bar is the Phosphors pull-down menu. If you know the phosphors code for your monitor, choose it. This code may be stated in the specifications sheet for your monitor; if you don't find it there, try checking the manufacturer's Web site or calling their technical support line. Trinitron phosphors are always listed. If you don't know, ignore this menu.

3. The next adjustment takes place in the gamma panel. Squint so that the screen blurs slightly. Drag the slider under the gamma box until the center square seems to match the lined outer square.

4. Uncheck the View Single Gamma Only box. You'll see three boxes — one each for Red, Green, and Blue. Use the same technique that you used for the single gamma box to adjust each primary color.

5. The white point of a monitor shifts over time, so it's best to make a manual adjustment. Click the Measure button in the White Point panel. Your screen will go to black and you will see three grayish squares on your screen. Click the square that is closest to a neutral gray. When that happens to be the center square, you have calibrated your monitor. You're almost done. Click OK.

6. You will be asked if you want to save your changes to the profile before closing. If you made your choices carefully, click Save.

Using Colorific

Colorific is another easy-to-use control panel calibrator. You should know the benefits of using it, if only to understand how easy it is to use. I find that it produces results in print that are somewhat more consistent with what I see on my monitor than does Adobe Gamma (but make no mistake, using Adobe Gamma is much better than taking your chances).

Colorific is published by E-Color, Inc. (`www.ecolor.com`; 415-957-9940) and retails for $49.95. It also comes bundled with a good many products, including several monitors from Compaq, EyeQ, Hitachi, Iiyama, LaCie, LG Electronics, Acer, Artmedia, and Samsung.

Using Colorific is easy. Follow these steps as prompted by a calibration dialog box:

1. **Adjust the brightness and contrast.**

2. **Adjust monitor gamma by choosing a square that is least visible when you're squinting.**

3. **Measure the monitor's white point by choosing a type of room lighting that prevails, attaching a "reference card" to the surface of your monitor, and adjusting your brightness and contrast controls until the color of the card matches the color of the monitor.**

   This is the only tricky part, because the room must be brightly lit during this one stage Measure the monitor's black point by using a similar method.

4. **If you're running Windows, you need to install a Colorific printer profile in your printer's preferences:**

   a. Go to Settings and choose Printers.

   b. Right-click the printer(s) that you are using to print in color and choose Properties from the Contextual menu.

   c. In the printer's Properties dialog box, choose the Color Management tab, and then click the Add button.

   d. An Add Profile Association browser appears.

   e. Choose the Colorific95 profile.

> **Cross-Reference**
>
> A new product called ProveIt! was recently introduced. It uses a hardware calibrator and costs less than $300 for both the hardware colorimeter and the software. You can also find out more about ProveIt! by visiting `www.color.com` or by calling 858-613-1300.

Using MonacoEZcolor

MonacoEZcolor (`www.monacosys.com`; 978-749-9944) works by prompting you through the steps necessary to calibrate your system. It creates custom ICC profiles for your scanner, monitor, and printer — so you get a complete workflow calibration system. Best of all, it provides a bridge between higher-end calibration systems, such as the Radius Pressview, and very inexpensive software-only solutions. You can buy the system with or without a hardware colorimeter. Called the MonacoSENSOR, the colorimeter sells for under $250 — which is thousands less than the more expensive systems.

You don't have to buy the MonacoSENSOR to use EZcolor. The software sells for just under $300, but it also calibrates your scanner. If you do a lot of scanning, the time you'll save in testing, calibrating, and Photoshop touch-up is well worth the price.

Running EZcolor is a bit more complex than using the two previous calibration methods. This doesn't mean that it's harder, only that more steps are involved. The steps are all guided; and as long as follow them, you definitely get more accurate results than if you just calibrate your monitor by using one of the methods described previously. One of the reasons for this is that Monaco uses a scanner target that's pre-prepared. A reflective target for flatbed scanners comes in the package. You can buy a Kodak 35mm slide target from Monaco for $80 or buy the same target from Kodak for just under $30. You can also buy targets for larger-format film.

The MonacoSENSOR makes the whole calibration process even more accurate because it attaches to your monitor screen and takes direct color measurements that are immediately specific to the individual monitor.

Mac owners should also take a look at Pictorgraphic's Candela ColorSynergy version 4.0. (`www.candelacolor.com`; 612-894-6247). ColorSynergy also does scanner, monitor, and printer calibration. The software costs just under $500, and it works with other manufacturers' color measurement hardware, such as X-Rite's Colortron II and DTP 22, so you'd have to pay extra for the accuracy that hardware color measurement can provide. ColorSynergy lets you create ColorSync profiles for most any type of device in the color workflow chain: reflective and transparency scanners, monitors, inkjet printers, dye-sublimation or thermal-wax printers, film recorders, proofing systems, or printing presses.

The X-Rite Colortron II comes with Mac-only color calibration software. The Colortron II is a spectrometer that you can use to measure color from any surface. This means that you can also use it to match the color in a printed chart to the color on the monitor or to check the fading in a color print under certain conditions over a fixed period of time. The device sells for just under $1,000.

Using high-end spectrometers and colorimeters

These are the most accurate of all calibration systems because all of the hardware is built specifically to produce predictable results (display card, monitor, and spectrometer or colorimeter). They're intended for anyone with a critical need (or perceived need) for accuracy — especially when it comes to collaborating. Two people at opposite corners of the planet will see exactly the same picture, provided they own the same system. All of these systems use large screens, and the screens are hooded to protect them from direct room light and glare. Several well-established companies make these systems for the prepress industry, as well as for designers, photographers, and corporations that do their own work in-house.

One of the most pervasive of these is the Radius PressView XL. For a bit less than $4,000, you get your own highly reputable instrument-based color calibration system that includes the following:

✦ **A giant monitor:** This monitor measures 21 inches, with a maximum truecolor resolution of 1,800 x 1,350 pixels, and has been carefully tweaked to display maximum color.

✦ **A hardware colorimeter:** This color measuring device and software lets you calibrate identically across both Windows and Mac platforms.

✦ **A monitor hood:** This hood helps cut out stray light and glare.

✦ **A set of Radius color profiles:** These profiles are for scanners, monitors, and printers (including presses).

By looking at the technology that comprises this system, you will understand why such professional systems need to be so carefully designed. For example, the entire case is made in a 50 percent, color-neutral gray. Faceplates are carefully treated so that they cut glare without diffusing the image. You can tune colors and focus in

quadrants of the monitor, rather than having one adjustment apply to the entire surface. You can correct pincushion and keystone distortion in more than 20 different quadrants of the monitor. The result is absolutely distortion-free images. The screen has very high refresh rates, so there's no visible screen flicker at all. This system even includes automatic compensation for distortion that is caused by the magnetic fields specific to your geographical location.

I mention the Radius PressView XL (www.mirodisplays.com; 650-988-7270) here specifically because it has long been one of the most popular systems. However, other highly accurate systems are worthy of your consideration; these include the Scitex (www.scitex.com; 781-275-5150) and the Barco (www.barco.com/display/index.htm).

Using a pressure-sensitive graphics tablet

If you're going to do much of the sort of image editing that requires you to retouch small details, to carefully make manual selections of objects (this is pretty much inevitable), or to do any freehand drawing at all, then forget trying to use a mouse. That would be like trying to make an etching with a bar of soap. Instead, you really want a digitizing pad like the one shown in Figure 7-10.
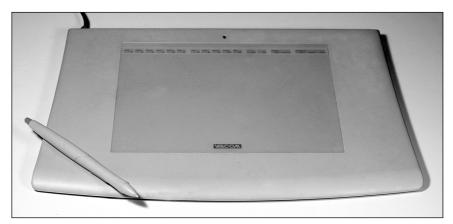
Figure 7-10: The Wacom Intuos 6 x 9-inch digitizing pad
Courtesy of Wavom Technology Corp.

A digitizing pad lets you draw on a flat surface with the pen. The position of the tip of the pen is always precisely related to a corresponding position on the monitor, regardless of whether you picked it up and moved it between strokes. In fact, you can even use a digitizing pen to trace an existing image.

By far the most widely used digitizing pads for digital imaging and fine arts folks are those from Wacom. Wacom pioneered the use of pressure-sensitive pens, which can change the size of the brush stroke or the transparency of the stroke (the type of alteration that takes effect depends on the setting you make in your image-editing software).

Wacom is also one of the few makers of digitizing pads that use battery-less pens. Batteries add considerably to the weight of the pen, which can make them feel less natural. Also, when the battery starts to die, unpredictable things start happening to your pen strokes.

Wacom's latest line of digitizing pads takes the feel of natural media even further. For example, there are new Photoshop plug-ins called *pen tools* and a new *airbrush pen* that lets you control the volume of paint with a wheel, just like a real airbrush. Also, when you tilt the airbrush, the paint area expands and fades with distance from the tip of the brush.

You may be able to find real bargains on other brands of digitizing pads. If so, any digitizing pad is better than a mouse. The following are features to look for in a digitizing pad:

   ✦ **Wacom-compatible pressure sensitivity:** Many software packages simply don't recognize the pressure-sensitive feature of other manufacturers' pens. Most of them know this and make their pens and pads Wacom-compatible.

   ✦ **Size:** Size doesn't matter nearly as much as having a pressure-sensitive digitizing pad. Some artists, however, will feel cramped by smaller pads. Big pads can take up lots of desktop, so most feel that a 6 x 9 inch pad is the best compromise. It feels a little more natural because it's approximately the width of letter-size paper.

   ✦ **Versatility:** Check for available extras, such as plug-ins for pen tools or special painterly effects, and different styles of pens and pucks (such as an airbrush, 4-D mouse, or cross-hair puck).

   ✦ **Resolution:** Anything over 1,000 dpi is workable. Some go as high as 2,500 dpi. More resolution simply means more precise control over the exact placement of the cursor (pen tip). The smaller the tablet in relation to the size of the monitor, the more important the resolution of the pad.

Choosing Output Devices

So, what happens after you've captured and digitized your images and processed them in almost any imaginable way by using the software mentioned in the previous section? You need to be able to show them to people. In other words, you need to *output* your images. Of course, you may be sending them to someone else for

final output, such as to a service bureau or to your client. Another possibility is that your images will only be used in electronic form, so you may not need to print them on paper. Most photographers, however, want to be able to see the image on paper. More importantly, most clients are used to seeing the images on paper or as slides.

Remember, if you need the output from one of the more expensive printers, you don't have to buy the printer to get it. Contact the manufacturer of the printer whose output you desire. Most maintain a list of companies (service bureaus) that will print your output for you.

Note   Conventional wisdom has been that inkjet printers produce prints that fade more rapidly than those made by any other printing technology. This has been true until recently because most inkjet printers used dye-based inks that are very susceptible to atmospheric changes, ultraviolet light, and moisture. Besides, inkjet printer manufacturers have only recently begun to pay attention to the quality of paper. Recently, several manufacturers have been producing pigment-based inks and acid-free, UV-coated papers. Preliminary tests show that prints produced with the right combination of these new inks and papers can outlast just about anything previously known.

The following sections are an overview of each type of printer or other output device. Each of these sections describes the category, explains its general usage and price range, and points you in the direction of the right types of products to look for.

Cross-Reference   You will also find a more extensive discussion about the three most common printer types — inkjets, dye-sub printers, and laser printers — in Chapter 17, along with installation, setup and maintenance tips.

PostScript interpreters

A PostScript interpreter, or RIP (raster image processor), translates your images into the language most commonly understood in the printing industry. This makes it essential if you want to make match proofs of images that will be used in printed publications. A PostScript interpreter is also essential for making color-matched color separations that can be sent directly to a print shop.

Many users will use digital photography as part of a prepress workflow. If you fit into that category (most users will at some point), you'll want to consider the options that your printer offers for PostScript interpretation. You can add PostScript interpreter software to virtually all popular types of full-color printers. However, generally speaking, you're better off if the interpreter is offered by the manufacturer of your printer. This is because printer features that are specific to your make and model are most likely to be implemented.

Printing is significantly faster for printers that have built-in PostScript interpreters, rather than requiring you to run the interpreter on your computer. However, the cost of the printer is usually significantly higher because the printer must have a built-in computer for interpreting the PostScript code.

If you are planning to run a wide-format printer, you will need a PostScript interpreter before your printer will print much of anything. Always look into which interpreters have been approved and recommended by the manufacturer of your printer.

Office printers

Many modern office printers, especially laser and inkjet printers, are able to reproduce color photographs well enough to incorporate them into office documents (such as letters or inventory records) or informal in-house publications (such as newsletters). However, it's rare that a printer that can output business documents quickly enough to support a small but successful law partnership can also print photographs that look and feel like photographs.

Printers that are intended primarily for the output of office documents — even those that can do a credible job of printing photographs — have one serious limitation for digital photography buffs and professionals: print size. Most are limited to legal-sized (8.5 inches wide) documents. Thus, they won't be able to do you much good if you need to make prints for exhibition, proofs of double-page spreads, or prints for photographer's portfolios.

Laser printers

Color laser printers simply can't produce color that's good enough for exhibition or for client approval. They can, however, produce very nice-looking photos in office documents and informal publications.

Most laser printers (and all of those that sell for under $1,000) are black and white only. Those that are most useful for reproducing digital photographs print at least a 600 dpi resolution.

If you plan to use your office laser printer for informal publications, you're better off buying one with a built-in PostScript interpreter. Some models of laser printers will enable you add PostScript as an option. You can also use a software interpreter, but then you diminish one of the major advantages of a laser printer: speed.

Laser printers have another advantage: print longevity. Because the inks used by lasers are pigment-based, their images are far less prone to fading than the output from dye-based inks. This makes them especially suitable for printing materials that will be posted on bulletin boards.

Inkjet printers

Generally speaking, you'll get the most bang for your buck from inkjet printers. Many highly affordable inkjet printers can do a good-to-superb job of printing photographs and a credible job of printing office documents. All of them, regardless of price, can print a digital photograph on glossy paper that looks and feels like photographic paper and with a quality that can fool noncritical observers into thinking that they are looking at the real thing.

The least expensive of these printers are relatively slow (typically 1 to 4 text pages per minute), so they are best suited to lower-volume personal or entrepreneurial use. However, this situation is changing. A few new, higher-priced (but still under $600) inkjet printers can print text at laser-printer speeds and that use variable-size dots to reproduce the appearance of continuous tone color.

For a few dollars more, you can purchase inkjet printers that either print in six colors (like the Epson Stylus Photo 785EPX shown in Figure 7-11), have variable-size dot patterns, or both. These machines can make prints that will fool all but the most knowledgeable experts and are of high enough quality for portfolio and exhibition work. Some desktop inkjet printers can even make prints as wide as 17 inches and fortunately, most serious individual professionals and hobbyists can afford them (under $2,000).

Figure 7-11: The Epson Stylus Photo 785EPX

Don't make the mistake of lumping all inkjet printers together when it comes to print quality. Bubble jets heat the ink until a bubble is formed that forces ink out of the head. The size of the dot can be somewhat unpredictable and the technology is still improving. Piezoelectric technology, so far produced only by Epson, minimizes overspray and splatter, thereby creating noticeably sharper edges and better-defined dots that result in more vivid and predictable reproduction of the appearance of continuous-tone color transitions so essential to the faithful printing of photographs.

Another type of inkjet is used in Iris printers that use variable dot size to produce even more continuous-tone images. I discuss these printers later in this chapter in the section about wide-format inkjet printers, but I mention them here because the latest development in desktop inkjet printers is variable dot size. Epson first introduced variable dot size in its Stylus 900, a high-speed office inkjet that can also produce incredibly sharp continuous-tone photographs by using only four inks (Cyan, Magenta, Yellow, and Black).

Another technology pioneered by Epson, and since adopted by other manufacturers, is the use of more than four colors of ink. The Epson Photo series of desktop inkjet printers use six colors. The additional colors are light yellow and light magenta. This allows for the reproduction of subtle changes in light colors without forcing dots to be spaced further apart. The result is the appearance of continuous-tone color, even in such details as highlights and skin tones.

PostScript interpreters are available for many—but not all—models of desktop inkjet printers. All of these interpreters are software-based as opposed to built-in. Be sure to check the manufacturer's literature for the inkjet printer that you are considering if you feel that a PostScript interpreter is important to you. You don't need a PostScript interpreter for a desktop inkjet printer if you just want to print personal, portfolio, or exhibition photographs.

Inkjet printers that are suitable for use by photographic professionals for larger than letter-size output fall into the following size and price categories:

✦ **Portfolio inkjets:** These are desktop printers that can make prints up to 11 inches wide. Most will print at any length. These printers work well for creating photographers' and models' portfolios, making exhibition prints, and for printing comprehensive tabloid-size double-page layouts. The Epson 1270, which can make a full-bleed tabloid-size image and can print with long-life inks and papers, is currently the leading example of this type of printer.

✦ **Inkjets for proofing and small gallery exhibition:** These are printers that can print at better than 600 dpi resolution, use archival inks and papers, and can make prints that are at least 16 inches wide. Although several 24-inch-wide inkjets meet these specifications, they tend to fall outside the price range of all but the most successful photographers. The one notable exception is the Epson 3000, which retails for less than $1,300. You can expect a more competitive situation in the coming months, however.

✦ **Wide-format inkjets:** These printers are generally purchased by service bureaus or corporate art departments. The most highly honored models for printing photos come from Iris, ColorSpan, and Epson (9000 and 4000).

Dye-sublimation printers

The best photographic quality and the most accurate prepress proofs still come from the high-ticket dye-sublimation printers because these printers produce true continuous-tone output. In fact, if anything gives away their identity as non-traditional photographic prints, it is the lack of visible grain structure.

These printers work by heating a plastic ribbon that contains the dye. The heat turns the dye to a gaseous state and these gases are then absorbed by the polyester surface of the paper. As they are absorbed, each point becomes its exact (one of 16 million) color. Because a dye-transfer head typically contains thousands of heat transformers, each of these dots is microscopically tiny. This process involves no halftone dots (as in lithographic printing) and no color dithering (as in inkjet printing).

So, why doesn't everyone just run out and buy a dye-sublimation printer? Because they're expensive, slow, and limited to tabloid-size or smaller prints. The cost of proof-quality dye-sublimation printers starts at around $4,000 and graduates up to around $16,000. Some dye-sublimation printers cost much less than that, but they don't produce prints that are as sharp and vivid as the best inkjets. The cost of materials per letter-size print is $5 to $8, compared to $2 or less for an inkjet printer. To top it all off, dye-sublimation printers aren't suitable for printing office documents, such as business letters or accounting spreadsheets because the require photo-quality papers and the cost of printing is to high to justify for office work.

Snapshot printers

One type of dye-sublimation printer generally sells for $300 to $600. These are the small, snapshot-size printers that are used to produce instant prints from prosumer and point-and-shoot digital cameras. These printers are a lot of fun at a party. They also have potential applications in professional assignments when you want to show an instant print to your client before proceeding with the shoot.

On the downside, most of these printers don't produce prints that compare in quality to their more expensive brethren. You pay two to four times more for one of these prints than for prints from a one-hour film-processing lab. Finally, it will take several minutes to make a print.

Photographic process printers

This is a class of digital printers that, because they use conventional photographic paper (silver-halide technology), have the unmistakable look of real photographic prints. They also have all the archival qualities of the best silver-halide prints.

Probably 80 percent of digital photographers would produce all their prints using this technology if it weren't for three considerations: price, size, and chemistry. These printers are very expensive. As a result, most photographers must take their work to a service bureau in order to get these prints. Most of these silver-halide printers can print sizes up to 50 inches wide and don't print in CMYK, so no color or gamma loss results from having to convert the original image data. On the downside, they can't print on substrates such as watercolor paper and canvas. As a result, they are best suited to art that is meant to look photographic, rather than "painterly." The following are the common photographic process printers:

✦ **Fujifilm Pictography** machines feature a process that uses lasers on conventional silver-halide photographic paper from a self-contained unit. The result is a continuous-tone print that is indistinguishable from a conventional photograph. Cost of equipment is high, but the materials' cost per print is much lower than that of dye-sublimation printers. This is an excellent choice for minilabs, event photography, and printing small art and portfolio prints. Pictography printers come in two sizes: the letter-size model 3000 starts at around $9,000, and the tabloid-size model 4000 starts at around $24,000.

✦ **Durst-Lambda** makes several high-production volume, wide-format printers that use silver-halide technology. The top-of-the-line Lambda 130 (around $330,000) and 131 (around $260,000) models produce prints up to 50 inches wide. They print at either 200 or 400 ppi (pixels per inch). The Lambda 76 (approximately $175,000) prints are up to 32 inches wide and the printer maxes out at 200 ppi. Otherwise, the technology and RIPs (Raster Image Processing) for these printers are the same. They can print on any standard photographic paper (positive or reversal) or backlit material (which makes them ideal for large-format signage).

✦ **Cymbolic Sciences LightJet** also uses laser technology to print on silver-halide paper. Prints are even crisper than the Durst-Lambda's. However, the pros I've spoken to seem to feel that the LightJet is better suited to large-format prints for the art market because of its slower throughput per image. LightJet printers start at $142,000 for the smallest model. This printer is available in three sizes: LightJet 5300 (max print size, 32 x 50 inches), LightJet 5500 (max print size, 50 x 50), and LightJet 5900 (max print size, 49 x 97). Cymbolic says that print time for a 50-inch square print at 200 ppi is 4.1 minutes.

You can't judge the quality of the prints produced by these machines according to their printing resolution — at least not in the same way you would with inkjet or laser printers. I've had many prints made on these printers at 200 ppi that are razor-sharp. At 400 ppi, you can see every minute detail that the sharpest lens can capture. Durst-Lambda also makes the Epsilon 30, a significantly less expensive machine (approximately $84,000) that uses fiber-optic LED technology (rather than lasers) to create true color RGB pixels on silver-halide paper. Maximum paper width for the Epsilon 30 is (you guessed it) 30 inches. Resolution is 254 ppi at 36-bit continuous-tone color depth. Durst considers the market for the Epsilon to be primarily portrait, even, and fine arts studios because the machine is markedly slower than the Lambda models. Prices are constantly changing as the technology (and the demand for it) evolves, but I have been paying roughly $200 for a 16 x 20-inch print.

Wax thermal printers

Wax thermal printers work much like dye-sublimation printers, except that the wax-based color ink never becomes gaseous. Instead, it simply melts onto the surface of the substrate (that's paper, in plain English). The resulting dots of ink are dithered by a method that resembles halftone litho printing — except the dots are typically coarse enough to be easily seen.

The big advantage offered by wax thermal printers is that the cost of their consumables is far lower. Because the technology is so similar to that of dye-sublimation printers, it's common for manufacturers (Alps, for example) to combine both types of technology into the same printer. Then, you can proof in affordable wax thermal printers and produce final prints from dye-sublimation printers.

Film recorders

Think of film recorders as being reverse slide scanners. Instead of outputting your digital photograph to paper, you record it onto film. The result can be either a positive (slide or transparency) or a negative. You can then treat this output just as you treat the conventionally made counterparts; that is, you can record a negative and then print on any conventional paper, make reversal prints from slides and transparencies, or use the transparencies for lightbox presentations and slide shows.

If this gives you the feeling that we have come full circle — right back where we left off when moving from conventional to digital photography — you're absolutely right. The difference is in the power we now have over the image's composition, color values, content, and special effects while it's in the digital phase.

The most popular film recorders, partly because of price and partly because of format, are those that record exclusively onto 35mm film. The following are the most popular film recorders today:

✦ **Lasergraphics Personal LFR Plus** is a high-speed (50 slides per hour) 35mm scanner. One version can accept a Polaroid proofing back. The LFR Mark II sells for under $10,000, can image up to 700 slides in eight hours, and also handles 4 x 5 inch and 6 x 7 cm camera backs. Resolution is 4,000 dpi — higher than the best 35mm film. Amazingly, this unit can shoot up to seven rolls of 35mm film at one time. It can also handle bulk film. The Mark III has the same features, but resolution drops to 8,000 dpi and the price drops to $14,000. Models DPM II and III are Mark II and III models that have been specially modified for negative film. The DPM models are priced $1,000 higher than the Mark models, but can shoot both negative and positive film. All other specifications are identical.

✦ **Montage Graphics FR2E** is a $7,000 recorder that has a 4,000 dpi resolution and will also take film backs from 35mm to 4 x 5 inches. The manufacturer does not recommend it for shooting negatives. A PostScript interpreter is standard for Mac users, but optional for Windows. It works with both Mac and Windows.

✦ **MGI Opal** is a $15,000 slide recorder with a 4,000 dpi resolution that can pro-duce slides from 35mm to 6 x 7 cm in size. The manufacturer recommends it for producing both positive and negative film from digital files. The unit can be configured for either Mac or PC; PostScript is optional. Another model from the same maker, the Opal Plus, has an 8,000 dpi resolution for under $20,000.

✦ **Polaroid 6000** is a film recorder with a 4,000 dpi resolution designed primarily for 35mm, but it also accommodates a 4 x 5 inch back or a bulk film back. No 6 x 7 cm roll film option exists, however. This unit can typically shoot 32 slides an hour in 36-bit color. Critics deem it the best for the buck; however, it is not recommended for creating negatives from digital files. Polaroid does make the ProPalette series, which is capable of shooting either positive or negative images. The ProPalette 7000's resolution is 4,000 dpi. This machine is excellent for making color negatives of digital images to be output to conventional prints; however, it's limited to 35mm film. It's also noteworthy for being priced at under $8,000. For about twice the price, the 8000 has backs for 35mm, bulk 35mm, 6 x 7 cm, and 4 x 5 inch film, captures an 8,000 dpi resolution, and shoots both reversal and negative films. The 8000 can produce 50 slides per hour and costs a mere $15,000.

Commercial Film recorders include the Cymbolic Sciences Fire 1000 and the Kodak LVT series. These film recorders are two to three times the price of the units listed previously, but can be expected to produce "no excuses" output for professional portfolio presentation or for making final color separations from film. Typically, ser-vice bureaus and corporate departments purchase these units because they don't fit within the budget of most individuals.

The Cymbolic Sciences Fire 1000 sells for a mere $50,000. It can make transparencies and film up to 8 x 10 inches. A 1,278 dpi, 8 x 10 transparency records in 18 minutes.

The Kodak LVT image recorder records on 8 x 10-inch film, but at much higher resolutions and at a much lower cost — around $40,000. Resolution is variable, from 10 to 120 pixels per mm.

A typical price from a service bureau for recording a 35mm slide from a digital image is around $10 for the first image and about half that for each additional copy from the same file. Of course, this is an average price. You may be able to get a con-siderably better price by shopping online, but I find that it pays to be in personal contact. It also pays to submit a print that matches your expectations as to what the finished slide should look like. Never expect service bureaus to be able to read your mind. Otherwise, their individual interpretation is just as valid as your own.

Set Up a Workflow

If you want to assure yourself of consistently top-notch results, set up a consistent workflow. By *workflow,* I mean a routine for doing things that assures minimum loss of image quality once your pictures arrive in the digital laboratory. Here are the minimum requirements for establishing that workflow:

✦ Archive your unaltered original images

✦ Make exposure and color corrections

✦ Crop to maximum usable proportions

✦ Save to a lossless file format that preserves layers

✦ Duplicate files that will be altered

The following sections further explore each of the preceding considerations.

Archive unaltered original

This step is even more important if your original images are in JPEG file format (you'll know if you see a `.jpg` or `.jpeg` extension as the last part of the image's filename). JPEG images allow you to store more images on a memory card at the expense of losing subtle color differences in the image. Because the image is nothing more than a matrix of solid colors, losing some of that color also means losing some detail as well as the possibility of creating colors that were never there (loosely described by the industry as "noise"). If you open a JPEG and then save it again, it is recompressed and, although the file gets slightly smaller, you lose even more image data. If you open and save a JPEG image more than a few times, it will simply turn to unacceptable junk. So if you ever want to start fresh with that image and give it a different treatment, change its basic settings, or use it at a different resolution, you'll need a saved, untouched archive of it.

As soon as you have downloaded your images, change the name of that folder so that it indicates a status of "to be archived." Then copy those files to another folder that indicates that these images are "to be edited." When you have enough images that are to be archived to fill a CD-ROM, burn them to the CD-ROM. If you're super careful about your images, make two copies of the CD and house the second copy in a different physical location to protect it from incidents of theft, fire, and natural disaster.

Make exposure and color corrections

Your next task is to go through your photos and use the following routine to make basic exposure and color corrections. You are aiming for an image in which none of the data is wasted on blown-out highlights and shadows, the color has been brought to an overall warmth or coolness that is flattering to the subject, and the midtones make the most important parts of the picture readable. You are then going to want to archive this stage so that you have a faster starting point when archiving other images.

The fastest way to bring colors to this level is to use your image editor's commands to do it automatically. In Photoshop 7, select Image ➪ Adjust ➪ Auto. The following exercise, in two parts, shows you how to automatically adjust a whole folder of images. Remember: Don't do this on a folder of original images. You may not like all of the results and, if that is the case, you won't be able to recover them.

Create an action

This exercise shows you how to autocorrect the levels, contrast, and color in an image. You can do this for any individual image, but here it's done within the context of recording these steps into one macro that can be executed at a single keystroke.

1. **From the CD, open the Autocorrect folder.**

2. **Open any of the files from within that folder, and duplicate it by choosing Image ⇨ Duplicate.**

   Close the original image by clicking its close button (located in the upper-left corner of the image window on Mac, upper-right in Windows).

3. **Create the macro. Choose Window ⇨ Actions. (Actions are Photoshop's version of macros.)**

   The Actions palette appears, as shown in Figure 7-12.
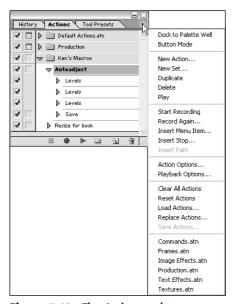
Figure 7-12: The Actions palette

4. **From the Actions palette menu, choose New Set.**

   You can skip New Set if you want to record the Action into the currently active set, but in this exercise, I'm assuming that you want a special set for your workflow procedures.

   The New Set dialog box appears.

5. **In the New Set dialog box, enter My Workflow as the name for the set and click OK.**

    In the Actions palette, a new folder appears, titled My Workflow. All the Actions in this set appear under this folder if the folder is loaded. (You can save, load, and replace actions by using the Actions palette menu.)

6. **At the bottom of the Actions palette, click the New Action button.**

    The New Action button looks like a curled up piece of paper that represents creating a new entity in any Photoshop or Photoshop Elements palette.

    The New Action dialog box appears.

7. **Type** Autocorrect **as the name of the Action and click OK.**

    The Recording button turns red. You are now recording. It is time to execute the steps that you want to include in your Action. From now on, you will perform this entire series of commands at a single mouse-click or keystroke. At this point, you are ready to move on to the next part of the exercise.

Autocorrect the image

In this part of the exercise, you incorporate all three methods of auto-correcting an image: Auto Contrast, Auto Levels, and Auto Color.

1. **Choose Image ⇨ Adjust ⇨ Auto Levels.**

    This eliminates detail-less highlights and shadows and does basic color correction with no further ado.

2. **Choose Image ⇨ Adjust ⇨ Auto Contrast.**

    This adjusts the mid-tones in the image and tweaks overall contrast.

3. **Choose Image ⇨ Adjust ⇨ Auto Color.**

    This adjusts the color for more natural skin tones.

4. **Choose File ⇨ Save As.**

    The Save As dialog box appears. Now save the duplicated image under a new name that you can increment with a number, so that each filename will be unique. In this example, I use Model as the basic filename.

5. **From the Format menu, choose TIF (it's lossless and this is a single layer file). In the Name field, enter** Model**. Click OK.**

    The Tiff Options dialog box appears.

6. **Click the Image Compression radio button that says None, and click the Byte Order radio button for IBM PC.**

    Choose IBM PC because it's a format that can be read by any popular computer operating system. Leave all other choices as their defaults and click OK. The file will be saved to disk.

Run the macro in a batch file

After you've recorded the auto-correcting of one image into an action, you will be able to correct all the images in the folder at a single keystroke or by double-clicking the action name in the Actions palette.

1. **Choose File ➪ Automate ➪ Batch.**

   The Batch dialog box appears.

2. **From the Play section, choose the name of the macro.**

   In this case, it's My Workflow.

3. **From the Actions menu, choose Autocorrect.**

4. **From the Source menu, choose Folder, and then click the Choose button.**

   A browser dialog box appears. Find the folder that you want to correct (be sure it contains no images that you *don't* want to correct) and double-click its folder icon. The browser dialog box closes and you're back in the Batch dialog box.

5. **In the Destination section, choose Folder from the Destination menu, and then click the Destination Choose button.**

   The browser dialog box reappears. Find the folder (even if it's the same folder) that you want to save the corrected files to and double-click its folder icon. You're back to the Batch dialog box.

6. **Check the Override Action Save As commands button.**

7. **In the File Naming section: enter the name** Model **in the first field, choose a two-digit serial number from the menu in the second field, and choose Extension from the menu in the third field.**

8. **Click the OK button.**

   You will see each file open and undergo the autocorrections, and you will notice that it has been saved under a new filename.

Manually correcting individual files

If your work with images is more critical, you will want to make the base corrections more optimally by doing them manually using the Levels and Color Balance commands. If the camera properly adjusted its white balance, you may not elect to use the Color Balance command.

One at a time, open each of the images in the copied archived images folder that you created and apply the following steps to each image:

1. **Press Cmd/Ctrl L to bring up the Levels dialog box (or do it the slow way by choosing Image ➪ Adjust ➪ Levels.**

   The Levels dialog box appears, as shown in Figure 7-13. Under the Histogram (the diagram that looks like a black mountain), you see three diamonds:

- **Black** to indicate the darkest point in the image
- **Gray** for the midtone (50% gray level)
- **White** for the brightest highlight
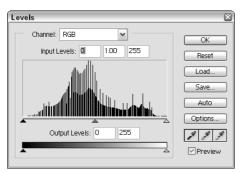
Figure 7-13: The Levels dialog box

2. **As previously shown in Figure 7-18, drag the Black slider to the point where the first significant rise in the Histogram occurs.**

   If there's a flat line, I recommend placing the pointer just where the Histogram starts to rise.

3. **Don't move the Gray (mid tone) slider yet. Drag the White slider to the first point where the Histogram starts to rise.**

   Note If your histogram stops declining at either end before it reaches the edge of the frame, then some of the potential brightness range in the image wasn't recorded by your camera. If you can, lower the contrast setting for your camera or put the camera on a tripod and bracket the exposure. The second technique only helps if both the camera and everything in the scene is motionless. Later, you can stack the bracketed frames and then use some information from all of them to get the scene's full range of brightness. See Chapter 11 for details.

4. **Make sure the Preview box is checked.**

   Drag the Midtone (gray) slider to one side and then to the other until you're happy with the image's contrast and the brightness of the midtones.

5. **Color-correct the image's overall tint (from the camera's point of view, the White Balance).**

   If there's an absolute white or black in the image, you can do this by choosing the black or white eyedropper and clicking that portion of the image. However, this doesn't usually work if the area is white or black because it is blocked up (that is, outside the range of the Histogram). If that's the case, click OK and go on to the next step.

6. **Press Cmd/Ctrl + B. (Or choose Image ⇨ Adjust ⇨ Color Balance.)**

The Color Balance dialog box appears, as shown in Figure 7-14.
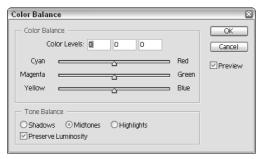
Figure 7-14: The Color Balance dialog box

7. **Drag to place the dialog box so that it is either overlapping your image or as close to it as possible so that your eye doesn't have to wander off the image while you're making adjustments.**

8. **Click the Preview box so that you can instantly see the results of your changes.**

9. **Drag the three sliders until you're pleased with the way the image looks.**

If you want to reduce the presence of a color, drag the slider away from it (and vice-versa). Always start by reducing the amount of any color that seems to be too prevalent, and then adjust for the color that seems to be lacking.

10. **If your adjustments go out of control, press Opt/Alt.**

The Cancel button becomes the Reset button. By clicking it, you can return the image to its original state.

11. **When you're reasonably satisfied, stop.**

Remember that this version of the image is meant to be a basic version that you can use in the future to take it in most any direction you may want to go in. So don't over-tweak. Click OK.

12. **Choose Save As and add Basic to the main filename so that you'll know not to alter it (except for the next two processes in this section) in the future.**

Crop to maximum usable proportions

Ultimately, you may want to crop this image to fit dozens of different frames and layouts. For that reason, I recommend against cropping unless you simply don't want others to see parts of the picture. If that is the case, now is the time to do that minimal amount of cropping.

Save to lossless file format that preserves layers

Because you've started doing some Photoshop work and may want to add layers when you open, duplicate, and do further work on the file, I suggest you save it in Photoshop format. You'll be able to read it on either Mac or PC computers, and many image-editing and paint programs can read the files. You can also save to TIFF format with layers, but although most other computers and platforms can read TIFF files, the enhanced TIFF files that will save layers are incompatible with most other programs. On the rare occasion where you do need the file to be in another format, it is easy enough to open it in Photoshop and then Save As to another format.

Duplicate files that will be altered

Remember that if you're going to alter the basic file that you just saved as part of this workflow, you should immediately duplicate it with the Image ⇨ Duplicate command. Then close the original image's window (remember to add the word *basic* to the filename (or any word of your choice that lets you know that this image shouldn't be altered). Next, choose Image ⇨ Save As and rename the duplicated file so that it has something like "V01" (for version or variation) in its title so that you know that this is an image that has been further altered.

Summary

This chapter has weighed the pros and cons of whether your purposes will be better served by a Mac or Windows operating system, the sorts of performance characteristics you will want to aim for if your editing time is more important to you than the cost of having the best system, and the workflow that you should begin as you transfer your images and begin their basic editing.

✦   ✦   ✦

Before You
Edit an Image

Part III discusses how to prepare for digital image editing. This discussion starts with methods for converting conventional (film) photographs to digital photographs. After all, film is still the source of most digital pictures. Then a plan is outlined for keeping your images organized in such a way that you can find the images that you need with minimal effort. This chapter is richer than in the previous edition because of the new ease with which you can display the data that the camera recorded when the image was taken, and because the latest Mac and Windows operating systems have excellent image-management capabilities. Finally, I cover how you to choose an image-editing program that suits your particular needs.

Converting Analog to Digital

You can turn an analog image into a digital image in one of two ways: Scan the analog image or take a digital picture of it. Most of this chapter deals with the tools, methods, and tips for scanning images. The techniques for photographing images are essentially the same as for copy photography. This chapter begins by discussing the various types of scanners and when each type is appropriate to a particular scanning situation.

Scanners and Scanner Software

Several types of scanners are available: sheet-fed scanners, flatbed scanners, transparency scanners, and drum scanners. All of these scanners will make a digitized version of any two-dimensional image (even if it's just type or lines). How well it works, however, depends on what you want to scan and which type of scanner you use. Of all these types of scanners, only transparency scanners (which include slide scanners that accommodate small-format films) and drum scanners are really well suited to digital photography. However, the other types of scanners may have some limited use. For this reason, I also discuss how each type may fit in, the uses for each type, and the most desirable features for each type.

When you look for a scanner — regardless of type — you should look for the fastest connection consistent with your computer. Best of all, look for a USB connection. USB is cross-platform, is nearly as fast as SCSI when used for most flatbed scanners, and won't present address conflict problems. Additionally, the latest generations of operating systems are more likely to support devices that are USB-connected than older parallel, serial, or SCSI devices. High-resolution scanners that offer a FireWire connection provide higher transfer speeds, but you need to add a FireWire connection to most Windows computers. If the FireWire card comes bundled with the scanner, that's a bonus, but you still need a spare slot.

The price of flatbed and slide scanners is plummeting (right along with most of the other pieces in the digital photography puzzle). Many of the low-priced scanners are true bargains, but before you make the decision to purchase a scanner, insist on scanning an image that is familiar to you. Don't accept a unit that produces muddy, unsharp, or streaked images.

Don't be fooled by claims of super-high resolution. The only resolution statistic that matters is optical resolution. Interpolated resolution is sheer advertising hype. Your image-editing program can do a better job of interpolating, but that's something you want to do only under the right circumstances.

Note   Resolutions discussed in this chapter always refer to the highest resolution that a scanner can capture. Unless otherwise stated, you can count on these scanners to capture at any lower-than-maximum resolution you may require at any time.

When and why to choose a flatbed scanner

Flatbed scanners are the most popular type of scanner for two reasons: They are comparatively low in cost, and they are capable of serving multiple purposes. Be aware, however, that the price range for flatbed scanners is enormous—from about $70 to tens of thousands. Figure 8-1 depicts a typical flatbed scanner.

Figure 8-1: A typical flatbed scanner

Flatbed scanners are boxes with a flat glass scanning area. This surface is usually large enough to scan a legal-size document, though there are no strict scan size limitations. A flap or lid swings down over the glass area to hold the document that is being scanned in place. Usually, a fluorescent tube illuminates the surface to be scanned and an image sensor slides from one side of the page to the other.

Flatbed scanners are the type most widely used for office applications and they are also the most versatile type. They are designed primarily for scanning documents and photographic prints — that is, reflective positive images on paper. You can use almost all flatbed scanners to optically recognize and store the content of documents; some flatbed scanners come with optical character recognition (OCR) software for this purpose. Many flatbed scanners are also packaged with software that enables you to use the scanner as a fax machine.

With the right adapters, flatbed scanners can be used for a variety of purposes:

   ✦ Scanning either flat or transparent artwork
   ✦ Optical character recognition
   ✦ Teamed with software so that your scanned pictures open right into your image editor

Additionally, flatbed scanners that are also able to scan *transparencies* (backlit documents) can also scan color negative film while removing the orange mask that is a property of color negative film.

Flatbed scanners come in a bevy of sizes, have a whole range of feature sets, and vary widely in resolution and color accuracy. You may find flatbed scanners promoted for as little as $50 that seem to offer reasonable resolution and color depth, but be sure to test the unit (or at least buy it from a highly-respected manufacturer) before buying it if quality photo reproduction is your goal. Most of the flatbed scanners that do a reasonable job of accurately scanning a 4 x 6-inch snapshot have list prices beginning at around $150.

If you want to scan film, make sure that the scanner has either a lid that can project light through the film or (much better) that has a separate drawer for scanning film. Many scanners come with — or can be accessorized with — a transparency adapter that consists of a lightbox above the glass bed of the scanner. This makes it possible to scan film by transmitted light as well as to scan prints by reflected light. These scanners are perfect for making contact sheets of an entire roll of 35mm film. However, resolution and other factors limit the scanning of transparencies to proofing and for position only (FPO) purposes.

Tip   I often make a contact sheet on a flatbed before I take the time to scan individual frames on a film scanner, since I generally only use about one out of every several shots.

Flatbed scanners with a film drawer do a much better job of scanning film for two reasons:

✦ The film doesn't have to be in contact with the glass flatbed.

✦ The film is placed in holders that mask it from the light.

These models are designed primarily for the graphic arts community and range in price from around $600 to around $2,000. When it comes to scanning 35mm film, these scanners don't even approach the quality provided by slide scanners, but are more than adequate for onscreen, Web, FPO, and proof purposes. On the other hand, flatbeds with a film drawer can be a workable and affordable way to scan medium (2¼ inches wide) to large (4 x 5 inch) format film. Agfa and Microtek are two companies that make such scanners.

Some models are now available with a transparency adapter that is just wide enough to allow scanning film. Generally speaking, these are more accurate than full-size transparency adapters for scanning film, and they cost less, too. If you're going to scan film, check to see if the scanner software can scan both positive and negative transparencies.

Resolutions of 600 dpi and at least 10-bit scans are commonplace and quite adequate for scanning prints and other opaque art. Pay particular attention to the features and power of the scanner's plug-in software. You should be able to see a large preview of your scan and to accurately adjust color balance and exposure before making the scan. After all, if you don't have the information in the original, you'll never be able to improve definition (although you'll see later in this book that you can certainly improve the illusion of definition and many other qualities).

Flatbed scanners typically scan images at a maximum optical resolution of 600 dpi, although mid- to high-end models that scan at twice this resolution are not uncommon. For example, the Epson 1640 scans at an optical resolution of 1,640 dpi for reflective art and 3,048 x 3,048 dpi for film. That's a higher resolution for film than is offered by the majority of slide scanners and the cost is lower than that of many film scanners intended for large-format film.

The most desirable features of a flatbed scanner are as follows:

✦ **Bit depth greater than 24 bits per pixel:** This feature is more important for slide scanners than for flatbed scanners, but will be helpful to anyone using a scanner for photos. A scanning bit depth of more than 24 bits per pixel enables you to capture more information and have somewhat more control over which parts of that information are condensed into what will ultimately be a 24-bit true-color RGB file. Some scanners capture 30 or 36 bits but export or save only 24 bits. Try to find a unit that exports the full bit depth to Photoshop if you want to exercise the ultimate level of control.

✦ **Built-in transparency adapter:** One of the primary uses of a flatbed scanner is to quickly proof your slides and negatives, but you can only do this if you have the ability to scan by transmissive light. You can also use this capability to scan some very small images for use on Web sites and other online content.

✦ **Worthwhile software bundle:** Some higher-priced scanners come with a full version of Photoshop that's worth more than the cost of the scanner. You should also get a decent OCR (optical character recognition) and fax package in the bargain. Because you may already have all these items, be sure to also look for software that lets you scan an image that is optimized when it's scanned. Remember that you can't add detail or color depth to an image after it's been digitized.

✦ **Optical resolution of at least 1200 dpi:** The higher your scanner's optical resolution, the better your chances of getting the quality you need from photographic prints — especially if you have to scan snapshot-sized prints or small portions of prints. High resolution is also especially helpful for scanning small- and medium-format transparencies. Ignore interpolated resolution claims altogether. Scanning at higher interpolated resolutions only results in having to store a file that's larger than it needs to be for the actual amount of information that it contains.

✦ **Sturdy construction:** Flatbed scanners tend to take more abuse because their size often puts them in harm's way and because people tend to flop the lids down when they're in a hurry. A flimsy scanner that produced nice images in its early days will stop doing so if its components get out of alignment or if the case warps.

When and why to choose a film scanner

Most folks who are "serious" about digital imaging start with a desktop film scanner. The following list outlines the reasons for this fact:

✦ **Resolution:** Film scanners typically offer much higher resolution, often matching or surpassing the resolution of the film that is being scanned. A year or so ago, the best desktop 35mm slide scanners scanned right at the "theoretical" resolution of ISO 100 film, which is about 2,700 dpi. Since that time, the price of these scanners has dropped by 50 percent, and the new generation of 4,000 dpi scanners that have taken their place on the price scale are becoming more and more affordable by the moment.

✦ **Brightness:** Film scanners record a much greater brightness range (than flatbed scanners) of 12 to 16 bits per color.

✦ **Easy positioning and focusing:** You waste less time positioning the original. In fact, the scanner usually positions the film automatically when you slip the slide mount or film holder into its slot. The scanner then automatically focuses on the surface of the film, although you can also manually adjust the focus on most models.

✦ **Flexibility:** Some film scanners, such as the Kodak 3600EFS, allow for scanning multiple frames to separate files in one operation.

✦ **Software:** Because they're made specifically for scanning photographs, film scanners generally come with software that has added features for more control over the quality of the scan. Additionally, film scanner software generally does a much better job of converting photographic negatives to positive images. Several come with scanning profiles for a variety of specific color negative films.

✦ **Size:** Desktop film scanners need only about a tenth of the desktop space usually required by the typical flatbed.

✦ **Clean images:** Some film scanners (Nikon and Minolta at the time of this writing) come with Digital Ice software, which can automatically remove surface dirt.

However, film scanners have drawbacks as well:

✦ **Cost:** Film scanners are usually about three to six times the cost of a high-resolution flatbed scanner.

✦ **Time:** Because film scanners typically scan at optical resolutions of between 2500 to 4000 pixels per inch (compared to 300 to 2450 ppi for most flatbeds), scans take three to six times as long.

✦ **Maintenance:** Because they are less commonly used, slide scanners are generally more costly to repair and maintain, in part because the percentage of qualified repair people is much smaller.

Choosing and using the right film scanner

The primary reason to choose a particular film scanner is generally based on two considerations: your budget, and how much you can expect to profit from the level of scanning capability that you're considering. If you're a service bureau that has to scan hundreds of slides each day or a pre-press house that must be able to produce any level of quality that the client demands, you'll simply have to pay the necessary price for a scanner that can get the job done. If you're in this type of situation, you may want to consider a drum scanner.

If you can't justify spending $5,000 to $25,000 on a drum scanner and if you don't have room for a machine the size of a small desk, the choice comes down to getting the highest quality and operational convenience available for a price that you can afford or justify.

If you're a professional photographer or if you have enough money to support your hobby or habit at peak capability, you want a scanner than can capture as much image information as possible and also offers the best software and the shortest scan times for a given amount of money. This means that you will have to use either a drum scanner or a high-end flatbed scanner with film scanning capability for film sizes larger than 35mm.

For 35mm negative film and transparencies, you'll get peak speed, performance, and capabilities from the top-of-the-line Nikon Coolscan 4000 series model, which provides very high construction and software quality, quiet operation, Digital Ice software that removes surfaces scratches and dirt, and the fastest scan times.

For about half the price of the Coolscan (around $2,000), you can get a scanner with the same 4000 ppi (or so) resolution from Kodak, Canon, Minolta, Polaroid and others. The trade-offs are generally in scanner size, convenience, versatility of the scanner software, and whether the scanner can scan multiple frames in the same pass.

You can also purchase lower-cost film scanners from the same general group of manufacturers (named in the previous paragraph) that are essentially last year's idea of a top-quality desktop film scanner. These scanners typically scan at the 2,700 dpi to 3,000 dpi resolution that is typical of ISO 100 film. The important difference is that the lower-priced scanner doesn't have enough information to capture as wide a range of light values, the features and technical components are last generation, and you can't suck all the definition out of super-fine grained film such as Kodachrome.

The most affordable film scanners can produce film scans that are adequate for inkjet prints of 8 x10 to 11 x 14 inches (roughly equivalent to a 3.2 megapixel digital camera image). They generally sell for $150 to $400. These scanners are best suited for office documentation of film files and for hobbyists who are just learning their way around digital photography.

Choosing and using drum scanners

If you have to print at very large sizes for exhibition or if you want to get as much information from the original film as possible — regardless of format — then you want a drum scanner. Also, a drum scanner represents a guaranteed way to get the most resolution, color-depth, and sharpness from either film or flat (reflective) art.

Drum scanners have been a mainstay in the publishing industry for years. In fact, it has only been in the past three years or so that you could even expect to find a flatbed or slide scanner in a pre-press shop, print house, or high-end corporate service bureau. However, the dividing line between the quality of film and drum scanners is beginning to fade (some may even say disappear) at the high end of film and flatbed scanners. Scanner developments are currently coming along so fast and furiously that it's silly to make very specific statements about specifications and capabilities.

Drum scanners are extremely expensive when compared on price alone. Small ones that fit on a desktop and that are especially great for scanning 35mm filmstrips or rolls at full resolution start at around $5,000. Some of the scanners that are used to scan work for large promotional displays, billboards, and fine-art paintings cost as much as $250,000 or even half a million dollars.

Scanner features and price

In order to choose a scanner, you may benefit from a bit of guidance as to which features you can expect to get for a given amount of money. Out of necessity, the guidelines that I provide are pretty rough. The amount you actually pay is probably going to be less than it was at the time of this writing, and you will probably get more features. You will also find some tradeoffs between features. For example, some units give you better software or a transparency adapter in exchange for lower resolution. Table 8-1 lists the features and prices for flatbed scanners, and Table 8-2 lists the same for slide scanners.

| Table 8-1 | | | |
| **Flatbed Scanners: Features and Prices** | | | |
Feature	*Under $125*	*Under $600*	*Around $1,200*
Transparency adapter	Rarely, usually small but some models don't even have the option	Larger transparency drawer or adapter	Should have transparency drawer
Optical resolution	600 x 1,200	25600 x 1,200	1,600+ dpi
Bit depth	30 bit	36 bit	36–48 bit
Signal-to-noise ratio	Mostly acceptable, but be careful	Professional	Superb
Density rating	Less than 3.0	Less than 3.0 for reflective, slightly better for transparencies	3.2–3.6
Application software	PhotoDeluxe, OCR, Fax, Photo-Paint	Photoshop LE, OCR, fax	Photoshop 4+, OCR, fax
Pushbutton or "one-touch" operation	Common	Sometimes	Seldom
Connection	USB, parallel	USB, parallel, SCSI	SCSI

| Table 8-2 | | | |
| **Slide Scanners: Features and Prices** | | | |
Feature	*Around $500*	*About $1,000*	*Around $2,000*
Optical resolution	1,500-2,400	2,700 dpi	2,700–4,000 dpi
Bit depth	30 bit	36 bit	36 bit with 36-bit output
Signal-to-noise ratio	Good	Professional	Superb

Feature	Around $500	About $1,000	Around $2,000
Density rating	Around 3.0	3.2–3.6	3.2–3.6
Application software	PhotoDeluxe or Publisher	Photoshop LE, Photo-equivalent Picture Paint, Digital Ice, Genuine Fractals	Digital Ice, Genuine Fractals
Connection	SCSI	SCSI	SCSI

Digital Ice

Digital Ice is software that scans the top, non-image layer of the film and subtracts the signal from any part of the image that isn't perfectly clear. Digital Ice is available on the Nikon Coolscan III and SuperCoolscan 2000. I have tested this software with the SuperCoolscan 2000, and it is undoubtedly superior to software such as PhotoDeluxe or Xaos Tools' FlashBox that removes scratches. Such software tends to give more overall softening to the image. (See the section on using scanner software later in this chapter for more information.)

Altamira Genuine Fractals

Genuine Fractals is another software package distributed with the Nikon film scanners. This is a new category of software for making extreme image compressions without the visually noticeable lossiness that occurs with JPEG-compressed files.

Unlike Digital Ice, you can purchase Genuine Fractals separately for about $160 (or $250 for the PrintPro version). Genuine Fractals is able to compress images to a quarter of their original size and enlarge them to more than ten times their original size with no sign of pixelization or "jaggies."

Note You may also want to consider LizardTech's Mr. Sid, which promises to compress to even higher degrees with no visible loss in quality or detail. LizardTech has just acquired Genuine Fractals and currently sells both programs.

Calibrating a Scanner

When you calibrate your scanner, you should also calibrate your system. You can do this by using guesswork or scientific precision. Because scientific precision costs extra, though, I show you the guesswork method first. In either case, you start by calibrating your monitor.

Cross-Reference   These processes are described in further detail in Chapter 7.

Calibrating by estimating

If you don't have a calibrator or calibration software — or even Adobe Gamma — set your monitor as follows:

✦ Reduce the brightness to about 38 percent

✦ Turn the contrast all the way up

✦ Reduce the color temperature to 6,500K, or even better to 5,000K

The resultant display will be duller and warmer, which is desirable because you are trying to imitate reflective color on paper.

You may have some software that at least helps you to make more educated guesses. Mac users can use the Monitors & Sound control panel on the Mac OS. If you have Photoshop, you can use the Adobe Gamma application that ships as a part of Photoshop, regardless of your operating system. Windows users with versions older than Windows 98 should upgrade.

You can also take a step up and use the software-only monitor calibration products from companies such as Pantone/Color Blind (Prove-It), Monaco Systems (EZ Color), and Praxisoft (WiziWYG). All three of these applications sell for less than $80 (in their software-only versions) and give you a bit more to go on than Adobe Gamma. All three also offer versions that will work with a Colorimeter at under $500. (For more on these versions, see the section on precision calibration later in this chapter.)

After calibrating your monitor, make a scanner target, such as the one shown in Figure 8-2. Open an image that you're familiar with; it should contain a portrait of a person (because these are the skin tones of which we're most critical) and a fair amount of color. At the bottom of the image, make a grayscale chart and a color chart. You can make the chart by choosing the gray shades and primary colors from the Swatches palette in Photoshop.

Print the chart on your color printer, and make adjustments until the printed output closely matches what you see on your calibrated monitor. After you're satisfied that you've come as close as possible to printing what you see on your monitor, make at least two identical copies. If you're using an inkjet printer to print your target, be sure to reprint your target periodically. Most inkjet prints fade over time.

Now you can calibrate your scanner(s). Put the printed target on your flatbed scanner and make adjustments until the preview window looks as much as possible like the target. Having the target image file open in your image editor while you are scanning the printed target is another good idea to follow whenever possible. This way, you get a side-by-side comparison.
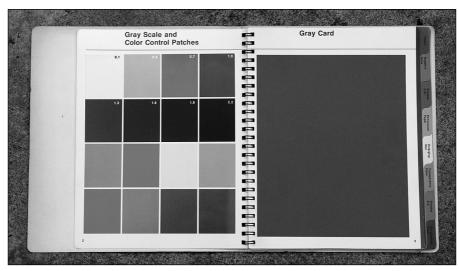
Figure 8-2: A gray card and color chart that can be photographed or used as a scanner chart

Calibrating a slide scanner is not quite so easy because you have to photograph your target. This gets complicated because you also have to test film and exposures until you get a reasonable representation of the target on film. Then you can hope to match your scan to the original image on your monitor.

Although a homemade target is better than no target, the most successful calibration results from having a target that is absolutely consistent — no matter where you find it. Several manufacturers make such targets for a variety of purposes.

Camera targets are useful for coordinating the color interpretation of a digital camera or film with the corrections that will be necessary to make it match the other components in your system. One particularly popular camera target is the Jobo Color Card, which sells for about $20. This card has primary and secondary color patches as well as six gray patches. The 11.4 x 16.9 cm card is large enough to hold or prop up for shooting at the beginning of each roll of film or memory card. This gives you a known comparison for balancing the white point of the film or camera. The card folds to 4.5 x 6.6 inches and is made of plastic so that it can be cleaned with a damp cloth.

Another favorite camera target is the Macbeth Color Checker, which is shown in Figure 8-3, and sells for around $50. This is a 9 x 13-inch card with 24 color squares — including those meant to represent skin, foliage, and sky. The card comes with a list explaining what each color typically represents.
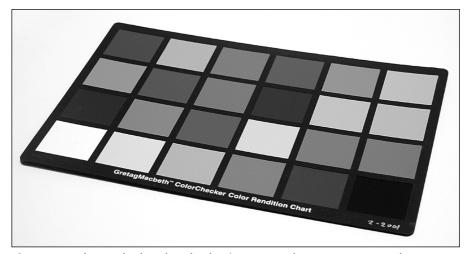
Figure 8-3: The Macbeth Color Checker is meant to be a camera target, but can be used as a scanner target as well.
Courtesy of GretagMacbeth

Monaco Systems provides an excellent target for either flatbed scanners or transparency adapters with their EZ Color calibration and profiling software. Unfortunately, you have to buy the whole package to get the profiling card. Figure 8-4 gives you an idea of what such a card looks like.

Finally, for calibrating film scanners, Kodak makes the IT8 target as a slide in several formats. The 35mm version is $40, and the 4 x 5-inch version is $100. You can order these targets from Monaco Systems at www.monacosys.com.

Precision calibration

In order to calibrate your monitor to represent what you print out as closely as possible, you need to purchase a software system with a *colorimeter*. A colorimeter is a device that works by attaching suction cups to the surface of a monitor, and then reading changes in light and color as the software adjusts the monitor. The monitor is then brought directly into line with how the output appears on paper.

The lovely thing about working with a colorimeter is that it's so easy. You simply follow a few instructions on the screen and, presto, your monitor is calibrated. The bad thing about colorimeters is that they were expensive until very recently. Now you can get one with any of the software-only calibrators previously mentioned, and the prices hover around $500. WyziWIG Deluxe is $600, EZ Color is $500, and ProveIt! is a mere $300.
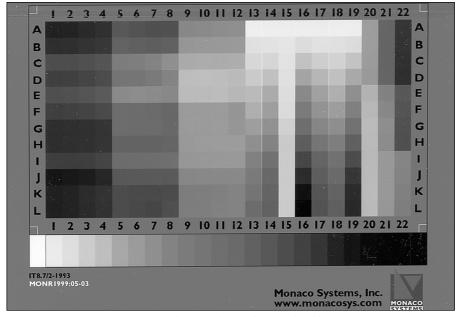
Figure 8-4: Monaco target used for both profiling and calibration

Proving that you don't always get what you pay for, EZ Color does both profiling and calibration and can be used for profiling LCDs and networked systems. The entire interface for calibration is wizard-driven. You just follow the prompts onscreen. If you get confused about what to do next, you can just click a button, and that phase of the operation is explained in plain English.

Paying Someone to Do Your Scanning

If you have occasional work that requires resolution, bit-depth, or scan bed sizes that are beyond your means; if you aspire to do this type of work; or if you have to make high quality scans of entire rolls of film and just don't have the time for it — don't despair. Some people specialize in doing this type of work in high volume, so you can get the work done for you at a reasonable rate — especially if you have a job or product that pays for it.

If you have been on a trip and shot lots of film, or if you have many rolls of film from a wedding, corporate event, or advertising shoot, you will usually find it best to scan whole rolls of film at once. You can then use your computer to preview them at something much closer to viewing size than a contact sheet provides. Furthermore,

you'll be able to preview them for your client (or friends) on a laptop before decid-ing which shots to use. Or, you can transfer only the photos you like to your hard drive, then use one of the programs listed in Chapter 9 to print them out as over-sized "contact" sheets, like the one shown in Figure 8-5, that show all the images side-by-side.

Figure 8-5: An example of an oversized and edited contact sheet

An edited contact sheet makes you look like a better photographer because the inevitable weak and awful shots are missing. Without these shots, every picture you shoot looks like a masterpiece.

You can get someone else to do the work for you in three easy and affordable ways. The costs vary depending on the volume of work you do, the degree of individual control you are given by the lab in question, and the resolution that you require. When you think of the costs of hiring someone else to do your scanning for you, remember that the alternative is to spend 10 to 30 minutes scanning each frame using your own computer and a desktop slide scanner (of course, those that scan half a dozen frames at a time will chop that down to about 4 minutes per frame and you can do something entirely unrelated for 28 of those 32 minutes).

Film processing labs

When you send film out to be scanned by the roll, it is usually scanned to CD. Some private film labs simply scan each frame to a standard TIFF format at a fairly low res-olution. The cost is typically around $3 per roll, though some "volume" labs do it for $1 per roll. The only differences between these images and those you scan at home (assuming you are scanning at the same resolution) are that the scanner used in the

lab is likely to have better optics and more consistent quality. Scanners used in labs are built to handle volume work and pictures are already archived onto a CD.

Picture CD

For about the same price, Kodak offers an alternative called Picture CD. In other price and fidelity ranges, Kodak also offers Photo CD and Professional Photo CD, which are not to be confused with Picture CD and which are discussed in detail later in this section. The newest Photo CD (distant) relative is Picture CD, a cooperative effort of Kodak, Adobe, and Intel. Picture CD is related only to the extent that, thanks to Photo CD, Kodak has more experience putting images and multimedia on CD than any other company. Picture CDs can be ordered when you have film processed at a consumer-level minilab, such as the ones at your local drugstores and supermarkets.

Intel's involvement makes Picture CD somewhat more Windows-friendly, but the images are stored in JPEG format at a single resolution of 1,536 x 1,024 pixels. That's roughly equivalent to the resolution of medium priced digital cameras. Picture CD also costs a lot less than Photo CD. Additionally, the fact that the images are stored in a cross-platform format means that you can open them on the Mac. None of the other features mentioned below work on the Mac, however.

Picture CD is different from Photo CD in other important respects:

✦ **You get your images placed on Picture CD when you drop your film at your favorite film counter.** You don't have to go to a photo store or service bureau. Costco, K-Mart, Walgreen's, Target, and Best Buy are a few of the outlets that offered Picture CD at the time of this writing, and more stores are being added to this list.

✦ **You get a lot of free software and tips from Kodak on a Picture CD.** So it's a good idea to try this for at least one roll of film, just to get the software.

✦ **You pay quite a bit less for Picture CD than for Photo CD.** The cost of an entire Picture CD, which can contain up to 36 images, is typically around $3. The cost of a Photo CD is generally between $1 and $3 per image, depending on the pricing of the company that is selling you the service.

Picture CD opens automatically when you insert it into the CD-ROM drive of any Windows machine that has the CD Auto-Start setting turned on. The graphics look like a magazine cover that illustrates the monthly change in the CD's collection of bonus articles and software.

The contents of the Picture CD are the interesting part. You get an image-processing program that's even more basic than Adobe PhotoDeluxe. This program lets you autocorrect exposure and color balance, crop the image, correct for *red-eye* (glowing red eyes caused by on-camera flash), rotate, and sharpen. The program is simple because you can execute almost all these commands with the click of a single button. Unfortunately, images are recompressed each time a simple change is made because you have no way to save to an uncompressed format before you make the edits. If you want to keep your images in prime shape, save them to TIFF format and then do the editing in another program.

Other features of the magazine include a fair amount of trial software from various "advertisers" and "tips and tricks" articles on a variety of subjects. For example, the first month's issue included free software from American Greetings for making greeting cards, software from MGI Software for making sports trading cards, and software from MetaCreations for Kai's PowerGoo — a program for making image distortions. Tips and tricks articles included "Ten Easy Steps to Taking Better Pictures," "Pictures and the PC," "Software that Makes the Most of Your Photos," and "Get Amazing Prints." Of course, these articles push the sponsor's products, but they're also well designed and highly instructional (especially if you're new to digital photography).

Picture CD also automatically posts your thumbnails to a Web site and links them to the corresponding full-screen resolution image. Once again, you can't use this software to do the same for your other images — only those on the CD. Still, this is a very handy capability. If you like it, you can do the same for all your images with inexpensive programs, such as Microsoft PictureIt!.

You can also use Picture CD to automatically make a Picture Disk of all the edited images, and you can mix images from several rolls. A Picture Disk is a 3.5-inch floppy that plays an automatic slide show on any Windows computer.

Photo CD

Like Picture CD, Photo CD is a product of Eastman Kodak. Both the CD and the images are proprietary Kodak formats.

To get a Photo CD, you submit your transparencies or negatives to a service bureau or lab that offers Photo CD scanning. Like all lab work, the color balance and cleanliness of the scans will vary from supplier to supplier. If you're going to have many Photo CDs made, it's a good idea to send the same film to several makers and then compare the results. In my experience, there isn't always a correlation between price and quality, either — so don't let that be your only criteria.

Two basic types of Photo CDs are available: Consumer and Professional. Consumer Photo CDs can hold 100 images, and you can add images to a partially filled CD (although this no longer makes much difference in the price because the cost of the CDs has dropped to under $2). Each image is recorded at five resolutions between 128 x 192 pixels and 2,048 x 3,072 pixels (approximately 18MB). The highest resolution is roughly equivalent to 2,700 ppi, which is the maximum resolution of most slide scanners. You can place images from film formats larger than 35mm onto a Professional Photo CD (APS film is slightly smaller and can be recorded).

Pro Master Photo CDs can hold only 25 images and the cost for recording is typically $4–$6 per image. However, this format can also take medium and large format film, and you can get one higher resolution scan of 4,095 x 6,144 pixels (approximately 75MB). You may seldom have a need for such a large file, but it's always safer to have too much resolution so you won't have to scan the image again. Also, if the client is paying for it, you may as well have the added insurance of knowing that you can use the result in very quality-demanding applications.

Photo CD images are written in a unique format. In order to read them, your image-processing program needs to know how to recognize the format. A Photoshop-compatible plug-in is included with Photoshop and Photoshop Elements, so if your image-processing program is compatible with Photoshop plug-ins, you will be able to read these files. You can't save the file back to Photo CD format without special software, so you should save the opened Photo CD format file in a well-understood cross-platform format such as TIFF. The CD-ROM format for Photo CD is also unique, but every multisession CD-ROM XA drive can read it.

The following are some reasons that you may want to consider Photo CD to be the means for digitizing your conventional photos:

✦ **No equipment to buy:** You just drop off your film at any place offering Photo CD service.

✦ **Thumbnails on the CD:** You don't have to guess which picture goes with which filename. The Photo CD comes back to you with full-color thumbnails, each of which is labeled with the number that corresponds to the filename. Of course, this consideration is less important if you also use a file manager, such as ACDsee, Thumbs Plus, or an operating system with built-in thumbnail file management — such as Windows XP or Mac OS X.

✦ **Low cost per scan:** Do a little shopping around, and you'll find that you can get Master Photo CD scans for as little as $1 each. Even at $3–$5 for Pro Photo CDs, the cost is much lower than the fees charged for custom scanning by service bureaus.

✦ **Multiple resolutions on a single CD:** The advantage in scanning at multiple resolutions is that you get as much detail as is possible at a given resolution. This is because the image isn't *resampled* in order to change its resolution. Resampling means that the computer has to add or eliminate information according to the "best guess" of a program. So, if an image has a thin line and the image is made smaller, the thin line may either disappear altogether or look much thicker in the reduced image.

✦ **Permanence:** Your original images are permanently archived on a nonerasable medium. No one is going to accidentally erase the disk. If you want to be really safe, you can even have multiple CDs made from the same roll of film.

Consider Photo CD as the preferred method for digitizing your photos under the following conditions:

✦ **When you can't justify the cost of drum scans:** If you're looking for very high-resolution scans, you have two choices: Pro Master Photo CD or a drum scanner. Custom drum scans can run between $10 and $50 each, and you only get one scanning resolution. Pro Master Photo CD gives you six resolutions for each image, and you can record several times as many images for the same amount of money.

✦ **When you don't have a multiple-format slide scanner:** If you're shooting medium or large format film and can't (yet) justify the cost of a larger format slide scanner or a drum scanner, Photo CD is the only answer.

✦ **When you don't have a scanner:** If you want to break into digital photography without buying a camera that costs as much as the computer, Photo CD offers you the best chance to get started with high-quality images.

✦ **When you don't want to be bothered with doing scans yourself:** If you're as busy as most people who make a decent living, then you may want to have someone else do all your scanning. After all, a handful of rolls of 35mm film can take hours to scan.

Service bureaus

You have many high-end choices for getting your images custom-scanned. Loosely lumped together, the companies that do this are called *service bureaus,* which is a fancy name for a store that sells some sort of specialized (usually digital) service. Because a lot of these specialized services (such as desktop publishing and pre-sentation production) overlap with digital photography, you will find lots of different companies with different "personalities" offering different types of scanning services.

Service bureaus specialize in services that may be unaffordable to occasional users, individuals, smaller businesses, and may also be appealing to large corporations that don't want to organize their own departments for doing such jobs. However, these bureaus offer services, equipment, and methods and expertise that are accessible to you and me. Many service bureaus that offer high-quality scans also offer related services, such as making separations for printing, darkroom work for traditional photography, or recording your images onto CD-ROMs (sometimes even in Photo CD format).

If you need to find a service bureau to do a particular type of scanning, the best place for professionals and those that need high-end services to look is in the magazines that cater to professionals in that industry. If you're looking for a place to do desktop scanning before you buy your own scanner, check out your local copy shop.

Tip   If you have a large, expensive, or critical project, *always* test before committing. That is, give the bureau a small job before committing to a big one. If you find anything questionable about their service or quality, try a couple of other bureaus before choosing the one you'll spend the big bucks on.

Proper Preparations for Scanning

Before you start scanning, make sure that you're ready to do the best job that you can. Of course, you can always rescan later. Unfortunately, the chances are excellent that you won't because you will have already put too much time into improving and editing the image that you scanned the first time.

Choosing the best film for scanning

Your choice of film may be dictated by considerations other than which film will give you the best scanning quality. For example, your client may prefer a particular film, so you take the path of least resistance. In that case, you simply want to get the best scan you can from the film that you have. Such considerations aside, the first step to take is to choose a film that gives you as wide a range of colors as possible and one that exhibits the finest grain and sharpness. Of course, you also have to use a film that enables you to work within the range of aperture and shutter speed appropriate to the subject. For example, if you're working in dim light or with fast-moving subjects, you need to use a faster (and, therefore, grainier) film than you would choose if you were working with your camera on a tripod or in a studio with strobes.

Having stated this, however, I tend to use negative film in most situations because this type of film, being less contrasty, is able to capture a much wider range of tonal values, and doesn't tend to block up in the highlights. On the other hand, if I want to get the most detail and contrast out of a subject photographed in very flat lighting, slide film is likely to be a better choice due to its greater contrast and (typically) more saturated colors.

Keep it clean

Be sure to keep your film clean. Even though it's much easier to retouch a digital image than to retouch a negative or print, it still takes time. You may want to use some of the following indispensable accessories when trying to keep your film and equipment clean:

✦ **A camel-hair brush (preferably with an air bulb):** The camel-hair brush can get the dirt out of small crevices, such as in film holders, in the hinges of flatbed scanners, and around the slot in the front of your slide scanner. I don't recommend using brushes to clean film, glass surfaces, and lenses for two reasons. First, the brush can create static electricity on those surfaces and that actually *attracts* dust. Second, brushes can pick up finger and facial oils and transfer them to the surface of lenses and film, which can do more harm than good.

✦ **A piezoelectric antistatic gun:** This is a piezoelectric pistol-like device that zaps film and scanner glass with a negative electrical charge that actually repels dust, hair, and lint.

✦ **Optician's cleaners:** Don't use paper towels and household glass cleaner to clean your scanner glass (or anything else optical, such as viewfinders and camera lenses). Paper towels are made of wood pulp and can actually make minute scratches on lenses and film. Sometimes these scratches are so fine that you can hardly see them, but they will diffuse light and cause the image to lose sharpness and contrast. Instead, buy the cleaners and tissues or cloths that are made for cleaning glasses and lenses from your optician or camera store.

✦ **Canned air or an air compressor:** This stuff is indispensable. It gives a good blast of air to blow dust away from film, lenses, and even the parts of a film scanner that you can't reach. I buy it in six-packs at my local warehouse store for just a little over a buck a can.

Turn it on and keep it warm

Make sure that your scanner has been warmed up for half an hour or so before doing any actual scanning. If you're in a shop that makes scans several times a day, turn the scanner on when you open shop and leave it on until quitting time. Otherwise, you may find that colors will shift, which can throw off your calibration.

Properly orient the original

Make sure that your negative or print is perfectly squared away. If you have to rotate your images in your image editor, you will sacrifice some sharpness and detail. Some scanner software gives you an option to automatically square up the image. Don't rely on this feature unless your ultimate use for the scan simply isn't critical.

Calibrate and experiment

When you first start using your scanner, carefully pick four to six successful images that are markedly different from one another in terms of principal color, dynamic range, and detail. Make sure that a couple of these are portraits. People tend to be more critical of skin tones than any other subject matter when it comes to proper color balance. Make adjustments in the controls until the same adjustments work well for the whole group.

Using the Scanner Software Properly

After everything has been properly profiled and calibrated, you can start scanning. Scanner software is different for almost every scanner. Nevertheless, virtually all scanner software presents some similar choices:

✦ Positive or negative

✦ Type of image: color, grayscale, or line art (bitmap)

✦ Scanning resolution

✦ Exposure adjustment

✦ Color balance adjustment

✦ Elimination of screen patterns

If you have a transparency adapter, film tray, or a film scanner, you should have a means of specifying whether you want to scan positive or negative transparencies. Look for scanner software that lets you specify the type of negative film. Negative films appear quite different after the orange mask is removed from the image.

Almost all scanners let you choose from a wide variety of scanning resolutions. If you are scanning to create an archival file that will have enough detail for most fine art and publication purposes, aim for a file size of between 25 and 40MB. Unless you are working with larger film formats, this will be enough resolution to capture all the detail in the film. On the other hand, if you know you are going to use the file for a particular purpose, make another scan that is just the right resolution for that purpose and you will get a sharper, cleaner scan. If you are scanning for publication, the resolution should be approximately twice the lines per inch (screen frequency). If you're outputting to a printer, it should be one-third the printer's resolution (the number of dots per inch divided by three primary colors).

Use your scanner's controls to bring exposure, contrast, and color balance as close to your desired goals as possible because this ensures that you have as much information in your data as possible. This is why you don't want to rely entirely on using your image-editing software for making such corrections. Figure 8-6 shows the interface for controlling the Epson 1650 flatbed scanner.

If you're not scanning from printed materials, be sure to turn off the feature that removes screens. It's usually labeled something like "screen removal" or "de-screen." If this feature is left on, you'll get a slightly unfocused scan because a digital blur is part of the technique for removing the original screen dot pattern. If you are scanning from printed materials, you will probably see a pattern that resembles an oil slick. This moiré pattern results from the pattern of the printing dots being out of register with the pixel matrix of the scanning resolution.
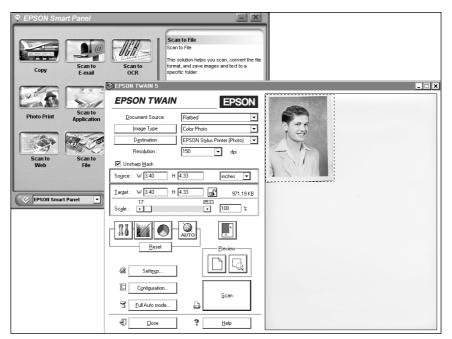
Figure 8-6: The interface for controlling the Epson 1650 flatbed scanner

By the same token, if you're scanning from film, be sure to turn off the scratch removal feature if your film doesn't have any scratches to remove. Also, turn it off if your scanner's scratch removal doesn't use Digital Ice or another method of reading only the protective film layer. Other methods, such as Photoshop's Dust & Scratches filter, remove scratches by blurring edges.

Most users just "make do" with the scanning software that comes with their scanners. If you're buying a flatbed scanner, chances are good that those folks will be more interested in the OCR and fax software that's offered. The best OCR packages I've tried are (in no particular order) Caere's OmniPage, Xerox's TextBridge Classic, and Visioneer's PaperPort software. These also happen to be the three OCR applications that I most often see bundled with flatbed scanners — even those at the lower end of the price range scale.

Using a Scanner as a Camera

A scanner takes a picture of a flat object. In fact, some beautiful flat objects would make a better picture if you used your scanner as a digital camera than if you used

your digital camera. For example, if the object is really close to flat, focus is likely to be sharper and more accurate. Also, it takes little to no time to set up. Just lay the object on the scanner bed, and then proceed exactly as though you were scanning a photo. You shouldn't have to be concerned about lighting. In the picture shown in Figure 8-7, I laid the flowers on the bed of the Epson 1650, covered them with my fleece jacket, and pushed the scan button. As you can see, a scanner can be a great way to quickly photograph many small objects. Scanners are particularly adept at scanning small objects (such as coins and stamps) "for the record."

Figure 8-7: The result of using a flatbed scanner as a camera

Tip

If you have a full-size transparency adapter on a flatbed scanner, you may want to experiment with scanning the object as both a reflective and transparent scan. Just make two separate scans, then put each on different layers in your image editor and experiment with different blend modes, layer opacities, and erasing through parts of one layer to reveal more of another.

Using a Camera as a Scanner

If you have to scan large works of art, you're going to be shocked at the price of very large flatbed scanners. Never mind the prospect of having to pay a few hundred bucks for a large drum scan. Unless you need to reproduce the large art at its original size, you may find that photographing it with your digital camera is just the right solution. Just make sure that the thing you're copying is evenly lighted from all sides, that there's no glare on its surface, and that it is perfectly centered and perfectly perpendicular to the camera.

Summary

In this chapter, I have outlined how to convert analog images into digital images. I discussed scanning, how to decide between scanner types, and how to make the choices for the right type of scanner. I also discussed the features and software used with various types of scanners. Finally, I told you that you don't have to buy a scanner to get good results. Of course, once you do buy a scanner, you want to use it to maximum advantage. To this end, I explained how to calibrate a scanner, either by approximation or by using mechanically precise methods. I provided some hints for properly preparing for scanning, making proper use of scanner software, and for occasions when you may prefer third-party scanner software. Finally, I explained how to use your scanner as a camera and your camera as a scanner.

✦   ✦   ✦

Cataloging and Managing Images

This book is a guide to improving your digital photographs — capturing the moment, creating visual art, and even enhancing the final product by using an image editor. These are exciting topics — likely to inspire your creative side — so naturally they get the lion's share of the material, as they should.

However, if you take a large number of photographs that are important to you, then from time to time you also find your-self knee-deep in the mundane, hum-drum and — let's face it — just plain boring side of digital photography. I'm talking about the tedious chores of transferring your photos from place to place, cataloging your photos for quick and easy retrieval, and archiving your photos for use in the years to come.

In this chapter, I cover the procedures, the hardware, and the software that you need to keep the boring stuff to a minimum, so you can get back to taking more great images.

Painless Camera-to-Computer Transfer

Whether you're professional or prosumer, hobbyist or full-time pixel artist, your images still have to travel somehow from your camera to your computer. Take it from me — your friends, family, and clients aren't going to be satisfied with the image from your LCD panel.

As mentioned previously in this book, a number of popular types of connections are available (some of which are totally unsuited for any camera above 1 megapixel). Therefore, to avoid the pitfalls that you may encounter when shopping, in the next section I answer some FAQs (frequently asked questions) about your transfer hardware and software.

Serial connections

For the sake of being comprehensive, this section explores one of the antiques of digital photography: cameras that use the original 9-pin *serial transfer*. Virtually all cameras manufactured before the days of USB (models that usually offer a maximum of 1 to 2 megapixels) used serial transfer, and they're as slow as a donkey. A single high-resolution TIFF image can take two *minutes* to cross from your camera to your PC.

Additionally, PC serial ports can be difficult to set up and troubleshoot, especially when you're connecting more than one serial device to two ports (such as an external modem). Unlike USB and FireWire, traditional serial ports are not Plug and Play: A reboot is usually required before your computer recognizes that the camera is connected.

Cameras that use a serial connection have only one redeeming feature today: They can be connected to a PC that doesn't have USB or FireWire ports. If you're buying new or late-model hardware, however, you can literally forget about cameras requiring 9-pin serial transfer. Or, if you're like me, you can hang on to one as part of your digital camera collection.

Luckily, most of these older cameras use SmartMedia or CompactFlash cards. So if your kids inherit an older 9-pin serial camera, you can use a modern USB card reader and transfer images at a decent speed. However, if the camera uses built-in memory that you can't remove, you're out of luck.

USB connections

As the current standard for image transfer, USB is a fine pick for digicams in the 2 to 3 megapixel range. A USB connection is reliable and has cross-platform capability. USB is also reasonably fast for image files under 400K or so, and it's Plug and Play (a big plus in terms of convenience). As discussed in previous chapters, virtually every late-model PC and Mac laptop computer has at least two USB ports available.

Tip   Transferring images over cable takes quite a bit of power, so use common sense to conserve those batteries! Before you start the transfer, make sure that you plug in the camera's AC cable or battery charging cable first, or use rechargeable batteries that you can "top off" after the transfer is over.

Within the next year, you're likely to see a number of digicams that can take advantage of USB 2.0 — you may also see it referred to as "USB High-Speed" — with data transfer throughput that actually exceeds today's first-generation FireWire connections.

FireWire connections

You can call a FireWire connection by any other name — IEEE-1394 or i-Link, for example — but until USB 2.0 cameras arrive, FireWire is still the current king of the hill and top of the heap. In other words, FireWire is the fastest method of getting images from your camera to your computer. FireWire is common in the Mac world, but you can also add an inexpensive FireWire card to your desktop PC for transfers.

Although USB 2.0 will take the lead in the horsepower race over existing FireWire connections, the 1394 Trade Association (which sets standards in the FireWire world) recently announced the introduction of IEEE-1394b, which uses special optical cables and delivers data up to a mind-boggling 8 *times* faster than first-generation FireWire!

Of course, you're not likely to see a camera with transfer rates that high anytime soon, but it's a good illustration of just how fast this technology train is moving. If you're planning on buying a 4 to 6 megapixel camera, I highly recommend either a FireWire connection or USB 2.0 for the foreseeable future.

Card readers: Pros and cons

On the positive side, a card reader can take care of the chore of transferring images from memory cards to your computer, thus relieving your digital camera of the battery-draining cable connection. (Your camera is an artist, not a dockworker.) A typical card reader, like those shown in Figure 9-1, can handle both CompactFlash and SmartMedia cards. However, do you *really* need the extra weight and expense of a memory card reader when traveling if you're not planning on taking hundreds of photographs a day? Ask yourself the following two questions to get an answer:

✦ **How many spare cards will you carry?** As previously recommended, the easiest solution is to pack additional memory cards to take with you on location. If you're traveling light and you only have two or three cards with you, then a card reader may not be a necessity; you can simply connect your USB camera with the cable and dump each card in turn. If you're like me, however, and your case is bulging with half a dozen cards, then a reader can be a real convenience when the time comes to dump all those images to your laptop or desktop computer.

✦ **How much is your time worth?** If you're a serious hobbyist, you're likely to have the time to connect the camera and AC adapter and shepherd the images to your computer's hard drive. This may require 15 minutes, perhaps, for a 32MB card that's packed with photos. On the other hand, a professional photographer on the job probably needs those 15 minutes elsewhere, and a card reader is a welcome time-saver. You can even leave your laptop running and your card reader connected for the fastest turnaround time.

Figure 9-1: Three popular models of card readers

PCMCIA adapters

Speaking of laptops, USB isn't your only option when considering transfer hardware: PCMCIA adapters are common among the road warrior crowd who travel extensively with laptop computers. These cards are usually cross-platform compatible, so you can use them on both Macs and PCs. Essentially, the adapter turns your memory card into a "virtual" hard drive, so you can use the familiar Windows Explorer or the Mac OS Finder to simply copy or move files from the card to the computer. This convenience can really make a difference after a busy day of travel.

Card adapters are also faster than a USB connection or a card reader. In fact, these adapters use the same Type I high-performance PCMCIA slot that's often used for a SCSI adapter or a PCMCIA hard drive. Unlike a dedicated external card reader, no cable connection is necessary. Lately, I've seen adapters that use the larger Type II slot as well, and they can handle Memory Stick and Secure Digital cards along with SmartMedia and CompactFlash cards.

Digital storage devices

Today's digital photographer can also take advantage of a whole new generation of stand-alone storage devices that can hold your images until you return home to your desktop computer. These devices usually come packed to the gills with the following:

✦ Anywhere from several hundred megabytes to several gigabytes of hard drive territory

✦ At least one slot for memory cards

✦ A USB, FireWire, or PCMCIA connection for your computer

The Digital Wallet from Minds@Work (`www.mindsatwork.net`) is the perfect example of a storage device that can eliminate that laptop from your next trip entirely. This miniature image warehouse can store 3, 10, or 20GB in a unit only a little larger than your digicam; it measures 3.69 x 5.2 inches and weighs in at a little over 11 ounces.

The unit is completely self-contained and comes equipped with an internal rechargeable battery. The Digital Wallet also has an LCD display that can display your directories and the remaining storage space. This device can accommodate CompactFlash, SmartMedia, Memory Stick, and PCMCIA cards and can transfer stored images through a USB connection to both PCs and Macs.

Need something even smaller? How about mass storage the size of a keychain? A new wave of solid-state devices that use no moving parts shows the direction that digital storage will take in the future. Manufacturers such as Sony and Cyclone are introducing 128MB storage "keys" that can plug into any computer with a USB port and retail for around $150. These units need no software or special drivers and are immediately recognized as hard drives under Windows XP and Mac OS.

Don't get me wrong — a laptop does have its advantages, and I'm not saying that every photographer wants to jettison their computer when traveling. For example, you can't view your images on the Digital Wallet, and you certainly can't do any image editing. Therefore, if you plan to work on your images while you're away from your desktop "digital darkroom," a palm-sized (or keychain-sized) storage device isn't going to help.

Must-have software features

Before I move on to other topics, I present a list of features that you should look for when considering digicam transfer software. These features pertain to both the software that's bundled with your camera and the third-party cataloging software that I discuss later on in this chapter. The more of these capabilities that are packed into the program, the easier it is to use.

✦ **File management functions:** Naturally, transfer software should allow you to selectively copy, delete, and move files — after all, this is the basic function for this type of software — but you should also be able to rename files and lock (or protect) files from the program. One feature that I especially like is the ability to rename multiple files in one step. Due to the fact that many digital cameras write the same filenames whenever you load a newly formatted

card, this helps to prevent conflicts with duplicate filenames on photographs that you've already transferred. Other programs load the images into a new folder and name the folder based on the date and time of the transfer. (As I mentioned previously, most digital storage devices that use USB or FireWire connections don't actually use a separate program; they simply appear as a hard drive or removable media drive to the operating system so you can use the copy, rename, and move commands built-in to Windows or Mac OS.)

✦ **Variable thumbnails:** Typically, I like to pack as many thumbnail images on a single screen as possible while I'm browsing the contents of a memory card, but I also like to be able to distinguish between similar shots if I'm in a hurry. The best transfer software does both by allowing you to view larger thumbnails when you're searching for a specific shot taken from a series in burst mode.

✦ **On-the-fly format conversion:** If your camera produces JPEGs and you want your transferred images in TIFF format, you can run a batch conversion after you download them. Some transfer programs can even save you that step by converting the images during the transfer process.

✦ **Image information:** If you're using a late-model camera that saves additional information, make sure that your image transfer software can read this information and carry it across to your desktop catalog program.

Of course, many of the image-editing and cataloging programs that I discuss throughout this book, such as Photoshop, Portfolio, or Paint Shop Pro, allow you to transfer images directly without requiring another program to acquire images. Commercial programs such as these can usually tackle the tasks that are supposed to be handled by the bundled software that came with your camera.

Painless Computer-to-Computer Transfer

At some point in your career as a digital photographer, you will need to send data from one computer to another, whether the machines are located right next to each other or are halfway across the planet from each other. Perhaps you're sending your images to a publisher (such as I did for the figures in this book), sending electronic proofs to a client, or simply sharing candid shots with the folks who attended last night's party. In this section, I discuss the advantages and disadvantages of each method of transferring images between computers.

Wired networks

Traditionally, a wired network extends only to the boundaries of the cabling. In other words, the computers that are part of the network are generally within close proximity, either in the same room or in the same building. However, both Microsoft and Apple have included features in their latest operating systems that allow secure external connections to a wired network over the Internet or a dial-up telephone modem connection; this way, you can even log in to your wired network while you're on the road.

The most common type of wired network in use today is a basic Ethernet configuration, which is illustrated in Figure 9-2, and which typically carries data at either 100 megabit or gigabit speeds. This type of network is suitable for anything from a home office to a medium-sized office building with 50 computers. Ethernet hardware is cheap, and you can use either coaxial cable or twisted pair cabling, which looks very much like standard telephone wiring.
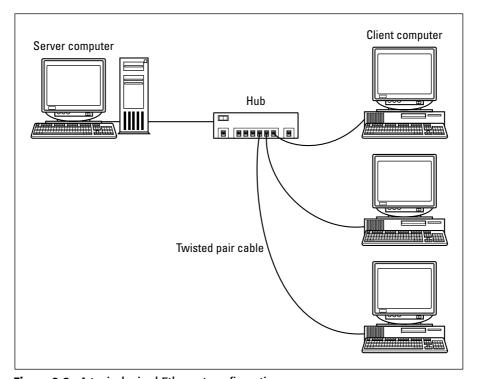
Figure 9-2: A typical wired Ethernet configuration

Because this book is about digital photography, I won't go into a long discussion of how an Ethernet network works here, but the basic idea is this: Any computer on an Ethernet network can "broadcast" data to another computer, much like a radio station. Packets of data, which can include anything from operating system commands to the fruit of your latest work on location, are sent across the wire and routed to the correct computer. This is all done transparently, and both Windows and Mac operating systems have all the support you need for basic file and printer sharing built-in — you don't need to buy any additional software to set up a home network.

Ethernet networking has become such a standard that any new PC or Macintosh that you add to your network probably already has a *network interface card,* or NIC, built-in. If you have a computer without network hardware built-in, you have to add a NIC (typically a PCI card for desktops, which usually run around $40, and a PCMCIA card for laptops, which may run as much as $100). To use twisted-pair wiring—something that I definitely recommend—you need an inexpensive device called a *hub,* which connects all the computers on the network. Cabling can run along the floor behind desks, underneath carpet (with the proper safeguards), or in the ceiling.

Tip   "All this sounds like I need a technical support staff just to install a home network!" This may be what you're thinking at this point, and if you'd rather not spend time buying the hardware and software for a small office network piece-by-piece, buy an "all-in-one" Ethernet networking kit that comes with everything: two or four network cards, a hub (usually for four computers), and all the cables and connectors you need. These kits typically sell for less than $200, and they're designed to be easy to install with full instructions, and everything is guaranteed to work with everything else. After you have your wired network working well, you can add other computers and take over the world—or at least your neighborhood.

Don't forget—a network has other advantages besides just transferring files, including multiplayer games, shared office applications, and shared Internet access. Neat!

Wireless networks

A wireless network uses a wireless hub to broadcast the same data packets that travel over the cabling in a conventional network. Each computer that accesses the network must have a wireless NIC. Wireless hardware devices are usually about twice as expensive as their wired cousins, but you can say goodbye to cables! To access the network, you need only move a desktop or laptop computer within a certain distance of the wireless hub (generally, this ranges from 50 to 150 feet), and the rest is taken care of automatically.

Wireless networking sounds great. So, what's the catch (besides the expense), right? Here are the two caveats to wireless networking:

✦ **Wireless networks are slow.** Although engineers are slowly increasing the top speed of wireless technology, a wireless network still provides only a fraction of the transfer speed of a wired network—typically about a tenth of the top speed of a wired network. If you're adding a network to speed the transfer of digital photographs from one computer to another, this is a real problem; hence the continued popularity of wired networks.

✦ **Wireless networks are less secure than wired networks.** You can make a common wired network quite secure from outside access (from sources such as the "hackers" you've seen in movies). After all, the data has to travel across a cable to get from one machine to another. Wireless networks, on the other hand, can be reached from some distance away. This is rarely a problem

because any potential invader still has to get by the login process; so just make sure that you don't share your user ID and password for your network with others.

> **Tip** Both wired and wireless networks can benefit from a simple firewall — a program that's designed to secure your network data from outside access. If you're running Windows XP or Mac OS X, you'll be happy to know that both operating systems have a basic firewall built in. For additional piece of mind, however, get a copy of Norton Personal Firewall from Symantec (`www.symantec.com`).

By the way, you may have seen home networks that use either your home's AC wiring or your existing telephone wiring; technically, these two technologies aren't "wireless" because they are still using a type of cable. Although you don't have to add any dedicated cabling, AC and phone line networks are just as slow and expensive as wireless networks — again, let the buyer beware.

Removable media

In the old days, computer tech-types called a floppy disk a *SneakerNet,* which simply means that you had to manually eject the floppy and walk over to the other computer to copy files. Removable media such as recordable CDs and DVDs and ZIP disks as a method of transferring images from computer to computer still offers the following benefits:

✦ **They're cheap.** You can store hundreds of megabytes of your images on a single CD-R disc. (I discuss this in further detail later in this chapter.)

✦ **They're compatible.** Although DVD-ROM and ZIP drives aren't available on every PC or Mac, it's a good bet that any computer you encounter will have a CD-ROM drive. Hence, no matter where you go in your travels, you'll be able to read your images from your CD-ROM.

✦ **They're easy to transport.** No need to run any programs or hunt for an Internet connection to reach your home network: With your data recorded on a CD-R, you're a walking storage device.

Don't forget, however, that you'll end up copying all of those files by hand from your media to the other computer — time enough to grab another soda or cup of coffee.

> **Tip** Never — and I mean *never* — trust your images to a floppy disk for the "long haul!" Floppies are infamously unreliable when compared to recorded CDs, DVDs and ZIP disks; one moment you can read them, the next moment they're headed for the trash can. If you're using floppies to transfer images from computer to computer (or if your digicam uses them for storage, like many Sony models), copy them over to your computer or archive them to a more reliable CD or ZIP disk as soon as possible.

Using FTP, Web, and e-mail

Finally, you can use the Internet as a method of transferring your images from Computer A to Computer B. This works best, of course, if both computers are using a high-speed Internet connection (such as a DSL, cable, or T1/T3 connection). Three types of image transfer are commonly used these days:

✦ **FTP:** This is one of the "grand old applications" of the Internet, and it was around long before the Internet became the fashionable hangout it is today. FTP is essentially a high-speed direct transfer between two computers using the Internet. One computer typically runs a FTP server (such as Serv-U32, shown in Figure 9-3), and the other computer runs an FTP client (such as AceFTP 2, shown in Figure 9-4). Using the client program, you can request one or more files from the server and send files to the server from the client program as well. I use FTP every day, and it's definitely the most efficient and fastest method of getting files from one computer to the other over an Internet connection.
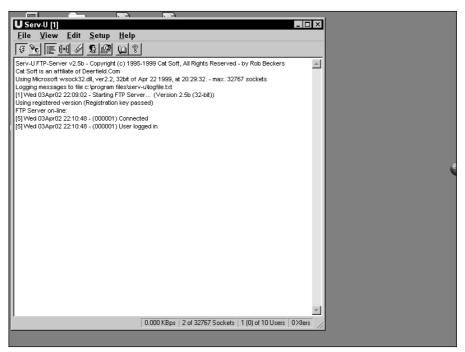
Figure 9-3: Hosting an FTP site with Serv-U32
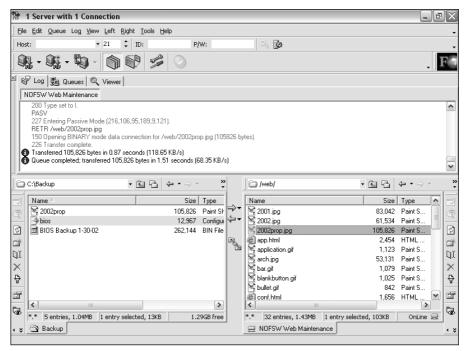
Figure 9-4: Sending a file between machines using AceFTP 2

✦ **The Web:** You may never have thought of a Web site as a method of transferring files, but many offices use an internal Web site, called an *intranet,* to transfer a common set of files from one machine (the Web server) to all the computers on the network. If you're distributing your images to the public, of course, a Web site makes the most sense. However, you can also run a "private" Web site (one that requires a login with an ID and password) to retrieve photos while away from your desktop.

✦ **E-mail:** Certainly, electronic mail is another method of transferring images from one computer to another over the Internet. However, I consider e-mail to be a last resort because the total size of the images that you send is strictly limited by your Internet Service Provider and your e-mail server. For example, I can't send any file over 2MB, and anything larger results in my Internet Service Provider immediately sending me a nasty error message. Also, many e-mail clients handle attachments differently, so you can't be guaranteed that an attachment will be correctly received on the other end. Use e-mail sparingly, and definitely don't plan on using it as your main method of transferring digital image files from one computer to another.

Cataloging Software on Parade

Photography is a visual art, which can make it very difficult to keep track of the images you've shot over the years—no matter how well you've organized them by subject or by date. After all, even a long filename that's immediately recognizable today may be difficult to identify a decade from now.

So how can you quickly locate an individual image that may be hidden somewhere among a handful of CD-R archive discs? This is where *cataloging* software comes in. This category of software consists of programs that are especially designed to help you organize your collection of images through criteria such as subject, date, shot information (exposure and f-stop settings), and text description.

In this section, I introduce three cataloging programs that are aimed at intermediate and professional users. I also discuss the cataloging features available within Photoshop 7.

iPhoto

Figure 9-5 illustrates the first cataloging program in the lineup—and the only one that's free (at least, for any Macintosh owner). This program is called iPhoto, from Apple, and it runs exclusively under Mac OS X 10.1 and above.
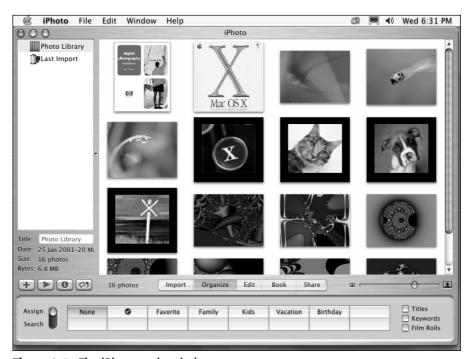
Figure 9-5: The iPhoto main window

iPhoto is certainly an attractive piece of work because it takes full advantage of the Aqua interface standard introduced with Mac OS X. As Apple has demonstrated with other freeware "i-programs" — such as iTunes — iPhoto is likely to be constantly improved and upgraded in the future. This program is not the best of its kind, but the price is right, and that makes it a good starting point.

This program uses the concept of a "roll" of digital film to separate images into multiple catalogs. Each session that you spend loading photographs (either from your camera or from your hard drive) is treated as a separate roll and is created in a unique folder. You can also sort the contents of a roll by the date that the photo was taken, or you can arrange them manually by dragging them into the desired order. Thumbnails can be resized as you like, making it easier to locate a specific image among a similar set, and you can add your own text comments to each image.

iPhoto also includes a basic keyword function that allows you to search for photos based upon keywords that you assigned when you created the roll. You can use the pre-configured keywords provided by Apple, including "Birthday" or "Kids," but a serious photographer is more likely to use the custom keyword feature (you can create up to 14 custom keywords).

When searching, you can create groups of keywords to search for more than one subject. For example, if you've added images under "Party" and "Christmas," you can choose both keywords and search for only those party shots taken during Christmas.

Unfortunately, iPhoto is quite limited when it comes to editing your photos. You can rotate one or more images at the same time, crop an image (as shown in Figure 9-6), remove "red-eye," and reduce a color image to grayscale. However, Mac owners have to turn to a native editor like Photoshop to make major changes to an image. iPhoto allows you to select the program to launch when you double-click on a thumbnail, which indicates that Apple recognizes iPhoto's limitations in the area of editing.

iPhoto also includes a number of unique features, such as a built-in slide show engine and the ability to order bound photo albums of your work directly from Apple. If you're a Mac owner and you're interested in ease-of-use, basic keyword searches, and occasionally rotating and cropping images, then iPhoto is worth a look.

Figure 9-6: Preparing to crop an image in iPhoto

Jasc Media Center Plus

Media Center Plus, shown in Figure 9-7, is another program from Jasc Software, a familiar company to those who've been using Paint Shop Pro since the days of shareware and computer bulletin board systems. However, Media Center Plus leaves the editing to outside applications; it's purely an organizing and cataloging tool. This program handles not only your digital photographs but your digital video clips and sound files as well.

Like iPhoto, Media Center Plus can acquire images directly from your camera or from your hard drive, but it can also catalog photos from CDs, DVDs, and removable media such as ZIP disks without having to copy them over to your hard drive, as iPhoto requires. The program can import all of the image file formats available within Paint Shop Pro, as well as digital video in MPEG and AVI formats and sound files in MP3, WAV, and MIDI formats. This capability can be a great advantage for those photographers who also dabble in digital video production.

Media Center Plus organizes these images and media files into albums, and you can sort the thumbnails in an album by using both a primary and secondary sort order

(a much more flexible and powerful setup than iPhoto). Figure 9-8 illustrates the Primary Sort dialog box. You can add comments to any thumbnail, and it's easy to search or select by comments. Each thumbnail can also carry keywords, and you can search by using those as well.
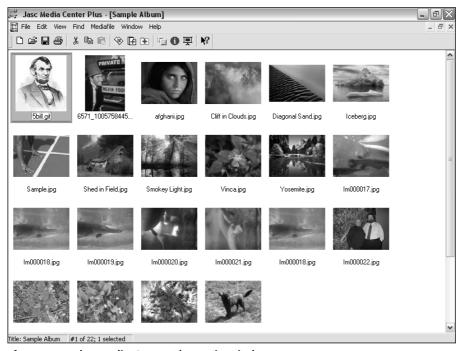
Figure 9-7: The Media Center Plus main window

Tip I particularly like the Export to Text option in Media Center Plus. This feature produces a text file containing the filenames, comments, and keywords for all of the media files in an entire album. This summary text file is perfect for folks that keep a separate database of their images, or for those who simply need a hard copy listing of their images for immediate reference.

Like iPhoto, Media Center Plus leaves the heavy editing work to other programs. This limitation makes sense here, however, because Media Center Plus can catalog so many different file types. You can choose an editor for each format (which may be an advantage for professionals), and it also sports a built-in rotation feature. The program also provides batch format conversion and batch rename options, which come in very handy if you need to make changes en masse on several dozen photographs.
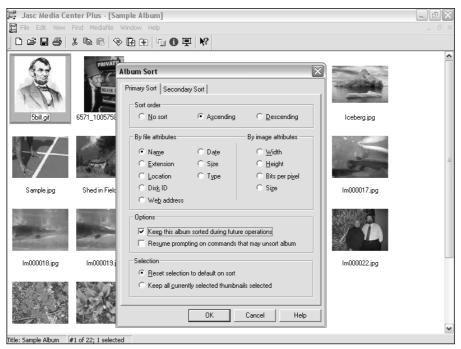
Figure 9-8: The Primary Sort dialog box provides control over the sophisticated sorting in Media Center Pro.

Media Center Pro includes the ability to display images in a slideshow, and you can build a custom screensavers by using your photographs (but only on the machine on which the program is installed). The Web album feature can automatically generate the HTML code to display all the thumbnails in an album as a Web page.

All in all, Media Center Pro is a great deal at $30 for the downloadable version, which you can find at www.jasc.com. It provides the basic cataloging and organizing features that most photographers demand.

Extensis Portfolio

If you've got about $150 to spend on organizing your photographs, Extensis Portfolio 6, which is shown in Figure 9-9, is a true professional "asset management" program. Sounds a little more impressive than media cataloging software, doesn't it? Unlike the other two programs discussed in this chapter, Portfolio is also available for both PC and Mac (although only under Mac OS 9 at the time of this writing; it runs under Mac OS X in Classic mode).
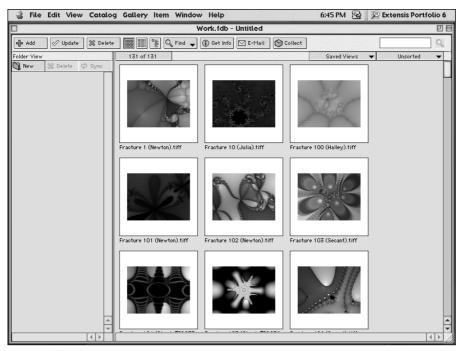
Figure 9-9: The Portfolio main window on the Macintosh

On the surface, Portfolio looks very much like iPhoto and Media Center Pro, and like the latter, it can also handle audio and video clips, offers keyword and comment searches, and can export keywords and file descriptions to a text file. Portfolio can also rename and rotate images. So what else do you get for the extra cash? A number of unique features:

✦ **Instant cataloging:** This, my friends, is a good thing! Unlike the other programs, you don't have to run Portfolio to add files to a catalog; simply right-click (or, on the Mac, Ctrl-click) on a file or folder anywhere in your system and add it automatically to a specific catalog with the Add to Portfolio command. I find this feature a great time-saver because I can take care of business directly from Windows Explorer or the Mac Finder.

✦ **Custom identification fields:** Images can carry any type of identifying information that you care to add, making it easy to fine-tune your search criteria later with data such as prices, Web addresses, and contact info.

✦ **Security:** Although not a problem for most of us, Portfolio does give you the option of increased security for your catalogs. You can assign four levels of access and set passwords that prevent unauthorized eyes from viewing the contents of a catalog.

✦ **Support for PDF files:** Because I use Adobe Acrobat PDF files in my work, the ability to add PDF files to a catalog is a handy feature.

✦ **Custom searches:** You can save a particular set of search criteria as a Find — a great idea for complex searches that you perform over and over because you don't have to specify the exact criteria each time.

✦ **Support for watermarks:** Portfolio can recognize, display, and embed DigiMarc copyright and licensing information (usually referred to as a *digital watermark*). Professionals who must closely monitor copyright issues (or want to embed their own information in their images) appreciate this feature.

✦ **Support for Photoshop, IPTC, EXIF, and TIF tags:** You can extract the tag information from a photo by using any of these standards.

I haven't touched on a host of other additional features that are available, but suffice it to say that Extensis Portfolio 6 is worth every penny to the photographer who wants total control over the cataloging and organization of all sorts of digital media. I use this program every day, and I highly recommend it for the prosumer and professional alike.

Cataloging with Photoshop

Before I close out this section, I should mention that Photoshop 7 now includes a number of built-in cataloging functions. They are nothing to match Portfolio 6, of course, but conversely, they are still nothing to sneeze at. By the same token, Portfolio is certainly not an image editor! (These applications aren't competitors; in fact, both Portfolio and Photoshop get an equal amount of use on my hard drive.)

The new Photoshop File Browser operates much like the Browser in Paint Shop Pro, with variable-sized thumbnails and a sorting feature. To edit an image from the File Browser, double-click on the thumbnail and it loads directly into Photoshop. You can easily rotate, rename, and move images from folder to folder, too.

Other Photoshop cataloging features include the following:

✦ **Support for EXIF tags:** The File Browser can display the information in both Photoshop and EXIF standard tags.

✦ **Custom sort rankings:** Need to assign certain images a higher priority than others? Create a custom ranking, which you can then use as a sort criteria within the File Browser. This is a great idea for locating photos that are part of your current contract or project.

✦ **Support for scripting:** The Macintosh version of Photoshop 7 boasts additional scripting commands to help automate batch processes, which you can use to rename or rotate multiple images at once.

Editing images with cataloging software

To be honest, no dedicated cataloging software on the market has image-editing features that compare in any way with the likes of Photoshop and Paint Shop Pro. In fact, most call on external editors that you can specify, which is the right thing to do, anyway. In fact, both Photoshop and Paint Shop Pro turn the entire concept upside-down because they incorporate basic cataloging and browsing features inside a dedicated image editor.

All the programs discussed in this chapter can rotate images and rename files; you can call these two features the "lowest common denominator" of editing chores. Depending on the program, you may also be able to crop and resize your photographs (I cover these operations more in depth in Chapter 11), and you may even be able to convert images from one format to another (a feature included in programs such as Media Center Pro and Portfolio). Therefore, when shopping around for a cataloging program, look for one that provides the simple editing commands you use the most — you won't be constantly shuttling between applications in order to prepare your photos for serious work.

Keeping Track of Photos in Windows XP

Windows XP is very digicam-friendly. It automatically recognizes most cameras with a USB connection, and provides a wizard to help you transfer images from your camera to your hard drive. Naturally, everything is stored in the `\My Pictures` folder, but the wizard does create sub-folders for each transfer session.

Viewing a folder of images in Windows XP displays an instant set of thumbnails, as shown in Figure 9-10. (If it doesn't display the thumbnails automatically, click View and choose Thumbnails.) Double-clicking on an image, however, won't automatically run the image editor. Instead, Windows XP opens the photo in the Picture and Fax Viewer application, as shown in Figure 9-11. In this application, you can rotate an image, print it, and (optionally) edit it. Personally, I find the Picture and Fax Viewer a pain, so I always right-click and choose Open, which loads the image in Photoshop instead.

Because you're still within Windows Explorer, you can rename and delete an image from the My Pictures folder, just as you do for any other file on your hard drive. You can also sort the images in the folder; click View and choose Arrange Icons by to display the pop-up menu, and you can set the sort criteria.

Unfortunately, the default Windows XP Search function leaves a lot to be desired. You can locate an image by its filename, size, and modification date, but that's about it. (Another good reason to use cataloging software.)
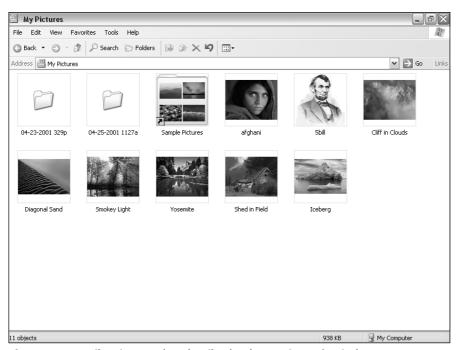
Figure 9-10: Voila — instant thumbnails, thanks to Microsoft Windows XP
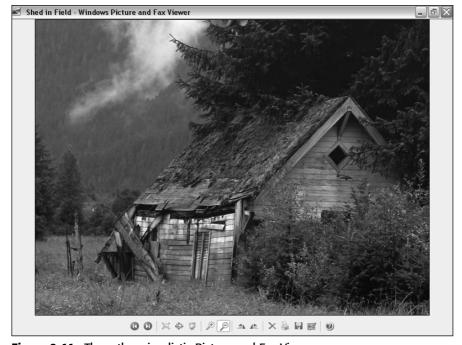
Figure 9-11: The rather simplistic Picture and Fax Viewer

Archiving for the Future

Previously in this chapter, I mention the process of archiving your digital images for the future. When you consider that most manufacturers of recordable CD media predict the "shelf life" of a CD-R to be at least 100 years, I think you'll agree that optical storage is the safest bet for storing your photographs. (Plus, it just happens to be one of the cheapest when you consider the cost of a CD recorder and a pack of 50 blank discs.) Figure 9-12 illustrates the main window from Roxio's Easy CD Creator Platinum, available at `www.roxio.com`. This popular CD recording software package is bundled with many CD recorders. On the Mac side, Roxio manufactures Toast, which is a funny name for a very good Macintosh CD recording program.
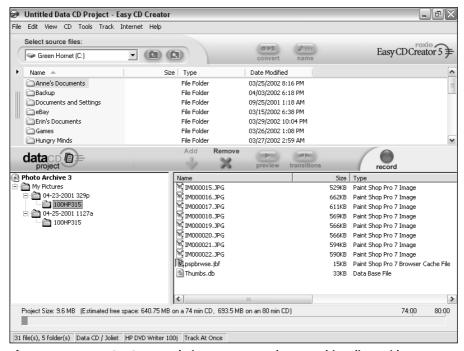
Figure 9-12: Easy CD Creator Platinum can record your archive discs with ease.

However, DVD recorders are now comfortably affordable as well. The question then becomes: Is there any advantage to storing your work on DVD-R (write-once) or DVD-RAM (rewriteable) discs? In this section, I discuss the advantages of both types of optical media, as well as how you should organize and store your archive discs.

CD versus DVD

Recordable CD hardware and media have two advantages over DVD media:

✦ **CDs are cheaper.** The price of both CD recorders and CD media (CD-R for write-once, CD-RW for rewriteable) is significantly cheaper than current DVD technology — $30 buys you 20 650MB CD-RW discs, but you'll only get a single 5.2GB DVD-RAM disc for the same price. A single 4.7GB DVD-R is around $10 at the time of this writing. DVD recorders are hovering at around $400, but a CD-RW drive will only set you back about $100.

✦ **CDs are more compatible.** Virtually every computer still operating on the planet has a CD-ROM drive, but DVD drives are still a luxury item for most computer owners in 2002.

As you've probably guessed, the attraction for DVD recorders is an issue of capacity: A common CD-R disc can hold only 700MB of data, but a DVD-R disc can hold 4.7GB. The question is, how much space do you — as a photographer — really need? Even with the larger images turned out by the latest 5 to 6 megabit cameras, a mere 650MB of storage space is probably enough to hold several years' worth of photographs.

Although DVD recorders can produce the same common recording formats as any CD recorder (data CDs, audio CDs and mixed-mode CDs), they really don't offer a great advantage in terms of recording speed. Therefore, unless you also have need of several gigabytes of storage for other purposes (such as video editing or audio recording), recordable CD technology is your best bet.

Tip   For a complete discussion of both CD and DVD recording (and step-by-step procedures using Easy CD Creator Platinum and Toast), I recommend the book *CD and DVD Recording For Dummies* by Mark L. Chambers, published by Wiley Publishing, Inc.

Organizing your archives

Even if you're not using one of the cataloging programs discussed previously in this chapter, you'll still benefit from a little logical organization when creating your recording layout. Keep these guidelines in mind:

✦ **Avoid sticking everything in one spot.** First and foremost, *use folders!* A disc with everything stored in the root directory (such as D:\) is going to drive you batty when it comes time to locate something. Use folders to separate and organize your CD-ROM layout before you record your archive.

✦ **Use long filenames.** Take advantage of every character that you can pack into the long filenames provided by Windows and Mac OS. You're no longer limited to eight-character filenames like those that may be generated automatically by your digicam, so descriptions are the order of the day. When recording a disc in Windows, this means using the Microsoft Joliet file system; under Mac OS, record using the Mac Extended file system.

✦ **Duplicate files in different categories.** Here's a trick that I use when archiving that may help you to locate the proverbial "needle in a haystack" photo:

Instead of adding an image to just one folder (such as "Portraits"), duplicate the same image in both the "Portraits" folder and any other relevant folders, such as a specific month and year or the name of the subject. Because a CD-R gives you so much space, use that extra elbow room to increase your chances of locating a particular photograph.

✦ **Include a thumbnail sheet.** If your image editor can produce a thumbnail sheet — a single image that contains the thumbnails of every photograph stored in a folder — it's worth it to include one in each folder that you create before you record your disc. This saves you time later because you won't have to browse those images in Photoshop or Paint Shop Pro; you can just load the sheet for a quick look.

Storing your archive discs

Before I move on, I should take a moment to mention how to properly store those priceless archive discs after you've recorded them. Here's a list of important things to remember when traveling with your archive discs or when you're putting them away for safekeeping:

✦ **Keep discs away from heat.** High temperature is the archenemy of optical media. (A disc is essentially a thin layer of alloy film sandwiched between two layers of plastic.) If a disc is badly warped due to direct sunlight or overheating, it's impossible to retrieve anything from it again.

✦ **Avoid touching the surface of a disc.** Hold a disc by the outside edge while transferring it from the jewel case to the drive and back again. This ensures that you won't smudge the surface of the disc with fingerprints, which can eventually lead to disc read errors (especially with DVDs).

✦ **Store your discs in jewel cases or disc albums.** Although discs are tough, they aren't indestructible. Keep them safe in their original jewel cases, if you have the shelf space; if you don't have the shelf space, buy a disc album. (I've seen albums that can store up to 250 discs in the space of 20.)

✦ **Label them correctly.** Never use mailing or address labels, which can unbalance a disc. If you do apply a label, don't try to remove it unless the label is specifically designed to be removed. If you don't mind a utilitarian appearance, an alcohol-free CD/DVD marking pen, which you can find at your local office supply store, can do the job just fine (without spending all that money for labels and printer ink).

Tip *Never pile discs on top of one another!* I know that I've been tempted to do so many times, but storing your discs in a pile in front of your monitor is no solution at all; constant friction and exposure to dust and dirt will ruin them faster than you may imagine.

Adding an Image as a Background

Ready to show off your latest work as wallpaper on your desktop? Both Windows XP and Mac OS X make the chore an easy task—and both operating systems also stretch your image to fit any screen resolution that you use.

Adding an image in Windows XP

To add an image as your desktop background from any folder on your system, follow these steps:

1. **Right-click on the Windows desktop and choose Properties from the pop-up menu.**

   Windows opens the Display Properties dialog box.

2. **Click on the Desktop tab to display the settings shown in Figure 9-13.**

3. **By default, only those images in your** \Windows **folder and your** \My Pictures **folder are available in the Background list. If your image is listed, click on it once in the Background list to select it.**

   However, you can use any photo on your hard drive by clicking the Browse button. After doing so, navigate to the file's location, click it to select it, and click Open. Windows displays a thumbnail preview of the desktop on the monitor screen so you can see how it will appear.

4. **Windows also provides three layout positions for your background:**

   • Click Position and choose Center to display the image centered on the desktop—if the image is smaller than the desktop, it is surrounded by a colored border. (You can set the color of the border by using the Color palette control directly underneath the Position drop-down list box.)

   • Choose Tile to arrange the image as a seamless grid (if the image is larger than the desktop, it's centered instead). Images created for Web backgrounds are good candidates for tiling.

   • Finally, choose Stretch to automatically resize the image so that it matches the dimensions of your desktop. Although Windows does a credible job if the aspect ratio of the image is close to that of your desktop, the image is likely to be heavily distorted if it has different proportions. Figure 9-14 illustrates the same image displayed in all three positions on my monitor.

5. **To apply the wallpaper without closing the Display Properties dialog box—a good idea if you're trying out a number of different images—click Apply.**

6. **To accept the image as wallpaper, click OK.**

Figure 9-13: All of your desktop chores can be performed from the Display Properties dialog box.

Figure 9-14: The three positions, in order: Center, Tile, and Stretch

Adding an image in Mac OS X

If you're using Mac OS X, follow these steps to select an image as desktop wallpaper:

1. **Click the Apple menu and choose System Preferences; then click on the Desktop icon.**

   Mac OS X displays the Desktop window shown in Figure 9-15.

2. **Click and drag the desired image from the Finder window to the well.**

   Mac OS X displays a preview of the image and automatically loads the wallpaper.

Figure 9-15: Selecting new wallpaper in Mac OS X

3. **Click System Prefs and choose Quit System Prefs to return to your new Mac OS X desktop.**

Summary

In this chapter, I discussed a whole range of topics — all related to transferring, cataloging, and archiving the photographs in your collection. I explained which hardware and software is suited for transferring images between digicam and computer, and also from computer to computer. I covered the features and highlights of today's most popular image cataloging programs, as well as the cataloging support built into Photoshop 7 and Windows XP. Finally, I compared recordable CD and DVD technology, and provided tips on organizing and storing your images on optical media.

✦   ✦   ✦

Choosing an Image-Editing Program

With image-editing software capabilities, there's no end to the miracles that various programs can accomplish, but first you have to decide which programs to use. The current professional version of Adobe Photoshop is the industry's benchmark program. Recently, sensing a need for a Photoshop-compatible middle ground between entry-level programs for the digitally intimidated and Photoshop, Adobe introduced Photoshop Elements. In this chapter, I start with Photoshop 7, the current professional version of the product, and then move on to examine the differences between the much less expensive Photoshop Elements and Photoshop 7. I then take a look at programs that are priced equivalently to Photoshop Elements, and finally, I discuss programs that typically retail for less than $50 and that are often bundled with digital photography-related hardware.

Important Features

The top-of-the-line Photoshop 7 has no direct competition. However, if you're considering programs that normally sell for closer to $100 but still have all or most of the features needed for serious photo-editing, the following sections outline the features that are most worthy of your consideration.

Note   It behooves you to use a program that is also used by your client, service bureau, or publisher. This way, you can be assured that the other party's program can read your files. You'll often want to share the work on a project, and sharing is much easier when both parties speak the same image-manipulation language.

Price

Image-processing programs with complete image-processing features start at $99.50 retail. Moderately higher-priced packages may have more "bells and whistles," but generally don't offer the automation, pre-press tools, or installed base support that comes with Photoshop professional. A covey of programs are also available with prices that tend to hover at around $50, and that are meant for those who simply don't want to have to spend any significant time studying a program in order to do the basics. Professional users also collect these programs because they are good at doing odd jobs around the home and office, such as printing small flyers, annotating contact sheets, creating gift and greeting cards, and so forth.

Free software

Equipment that you need to purchase anyway, such as digital cameras, scanners, and even flash memory film cards, often comes with very good image-editing programs. However, you're not likely to find Photoshop 7 bundled with an inexpensive digital camera because the camera manufacturers assume that the majority of the people buying these types of cameras are looking for simplicity and convenience in the software that they use. Rather than having control over every aspect of an image, some users would rather have a program that takes care of correcting common problems at the push of a button. As a result, the image-processing programs that are included in the price of these cameras fall into a category that I call SOHO (Small Office, Home Office) image processors.

Mid-range programs, such as Photoshop Elements, are often bundled with scanners, particularly those in the price range over $300 and those that come with a transparency scanning attachment. Some of the software included with a scanner may be low-end, but almost all image editors have some unique capabilities, so you may be able to find a use for certain unique talents that they possess. Before you buy, check how current the version of the software is and which (if any) of the program's features have been eliminated. The good news is that when a bundled program's features have been limited, you usually have the opportunity to upgrade to the full version of the program at a very reasonable price.

Tip   Bundled software is often the version that was current when the product that it is bundled appeared on the market. That doesn't mean you have been cheated. You're usually entitled to download a free update from either the software or hardware manufacturer's Web site.

Automating command sequences

If you are working in a production environment, you definitely need a program that enables you to link a series of frequently used commands to a particular menu selection or keystroke combination. For example, with one click, you can apply all the necessary commands to fit an image within a particular size and color palette

and then save it to GIF format for publication on the Web. Photoshop's Actions, in addition to its brand-new scripting capabilities, make it the program that is most highly qualified in this area.

Note If a program doesn't offer automation (but does include a feature you have to have), there are utilities (like QuickKeys on the Mac and AppleScript) that can automate keystrokes independent of the application.

Image-processing features

Any worthy image editor should provide the tools necessary for altering exposure, contrast, tonal values, and color balance. The image editor should also provide a wide range of painting and retouching tools; including an airbrush, paintbrush, clone tool, and blending tools. You should also have numerous ways to isolate portions of the image so that they are protected from subsequent commands. In other words, your image editor should have a full set of selection and masking tools — including some that help automate the masking process.

Layer editing

Layer editing is one characteristic of professional digital darkrooms that really sets them apart from most of their sub-$50 "click 'n fix" counterparts. Layers allow you to isolate as many images as you like within a given file. These images appear to be stacked directly on top of each other and any transparent portion of the image reveals the image below it. You can control how each of the layers affect underlying layers, meaning that their pixels are added, subtracted, multiplied, and so forth. You can also control the transparency of the entire layer.

File and device support

Most image editors let you open all commonly used bitmap file types (including the 17 separate file types in Photoshop 7). Photoshop 7 and some other programs also open and then rasterize (turn into bitmaps) some vector file types.

You should also make sure that the program supports your input and output devices, such as camera, scanner, and printer. If the program supports TWAIN, then any TWAIN plug-in for any TWAIN device will work.

Photoshop plug-in compatibility

Photoshop pioneered the use of plug-in extensions. These plug-ins make it possible to import new types of files or to interface with devices such as new digital cameras and scanners. They also make it possible to create many special effects, such as simulating paint brush strokes in various artistic styles, making motion blurs, or distorting selections. With so many powerful plug-ins available now, using a program that doesn't support them means giving up considerable image-processing power.

Interface familiarity

When you drive another person's car, you probably already know the location and use of the brake pedal and steering wheel. It's also easier to "drive" a new program if you understand the layout of the controls. You want to find a program that feels familiar. If you're brand-new to graphics programs, the program that you buy will serve as a training ground for other graphics programs and when you buy your next image-editing program, you will know what you like and need in an interface.

Painting and retouching

Painting and retouching tools and features should be as rich as possible. At a minimum, the Toolbox should include the following tools:

✦ **Paintbrush:** Used to apply color to an image. Some programs also allow you to set paintbrush options that imitate natural media or create special effects.

✦ **Airbrush:** Used to apply a soft-edged paintbrush stroke that builds up in color density. Some airbrushes can do fancier things, such as wet edges or to start dripping paint when you've applied too much.

✦ **Pencil:** Used to draw hard-edged lines.

✦ **Line tool:** Used to draw straight lines.

✦ **Cloning tool:** Used to copy one brush-sized area of an image to another image.

Check for flexibility in the program's ability to do gradient fills:

✦ Can it do multiple shapes of gradients?

✦ Can you use more than two colors?

✦ Can you use an unlimited number of colors?

✦ Can one of the "colors" be transparent?

Photoshop and a few other programs also include the ability to create vector paths, just like those used in illustration programs. Depending on the program, you can stroke these paths with any of the brushes or automatically convert them to a selection or mask.

One professional image editor, procreate's Painter 7, enables you to paint brush strokes that imitate traditional artist's tools, materials, and even painting styles. Some other programs offer some natural-media brush strokes, but none offer as many choices or as much flexibility as Painter. Nevertheless, any natural-media capabilities can be a bonus, unless you want to keep all your work looking strictly photographic.

Vector path drawing

Some image editors allow you to draw *vector paths,* which are geometric formulas for shapes that are resolution-independent; you can edit, re-shape, and transform them to any size. You can then turn these paths into very accurate and smooth-edged selections, which can be turned into bit-mapped portions of the image. This allows you to treat them with photo-editing tools and commands (such as the plug-in filters for artistic effects). Vector paths can also be used to trim out an irregularly shaped boundary for a photo that will be incorporated onto a page in a publishing program such as Quark Express or Adobe In-Design.

Image editing

Image editing is the term usually applied to programs that perform as digital dark-rooms. The term is also used because the functions that control the qualities of the image are among the most important, such as:

✦ **Color manipulation:** You should be able to control not only brightness and contrast, but also where the whitest and blackest tones in the image fall and where the midtones lie. A good image-editing program should also give you control over color balance and saturation, as well as the ability to substitute one color for another, which is very useful in catalog work.

✦ **Darkroom tools:** You should also have darkroom tools for editing small areas of the image, which includes the following:

  • Burn (darken)

  • Dodge (lighten)

  • Desaturate (remove color)

  • Blur

  • Sharpen

  • Smudge

✦ **Image rotation:** You should be able to rotate the image to any degree — preferably either by typing an exact number or by dragging a corner of the image or current selection.

✦ **Image manipulation:** Another useful effect is the ability to shrink or exaggerate portions of the image by stroking them with a brush. The result is very smooth transitions between rescaled portions of an object and the originals. This enables you to make caricatures, for example.

✦ **Image selection tools:** You won't be able to effectively edit portions of an image unless you can quickly and accurately select the portion that you want to edit. Your selection tools should include the following:

  • **Rectangle:** Makes a rectangular or square selection marquee when you drag diagonally.

- **Elliptical:** Makes an oval or circular selection marquee when you drag diagonally.

- **Row:** Makes a one pixel wide selection from one side of the image to the other.

- **Column**: Makes a one pixel wide selection from one side of the image to the other.

- **Lasso:** Enables you to draw a freehand selection marquee

- **Polygon:** Enables you to draw a straight-edged polygon marquee of any shape.

- **Magic Lasso:** This selection tool automatically adheres to "edges" (rows of adjacent pixels that are similar in color and contrast with their immediately surrounding pixels).

- **Magic Wand:** This tool automatically selects an entire area within a given color range.

Special-effects processing

This is the area in which professional image-processing programs seem to vary the most. However, most are compatible with Photoshop plug-ins, so you can add an awesome variety of special effects if you're willing to pay the extra cost for the plug-ins.

Wacom tablet compatibility

You will have a much easier time working in image-editing programs if you use a pressure-sensitive digitizing tablet and pen. This is especially true when making selections, retouching, and using the tools that affect brush-sized areas of the image. If your usual control device is a mouse, you'll have to adjust to these tablets, but the productivity payoff is enormous. Most tablets, regardless of the maker, are compatible with Wacom drivers. For this reason, these drivers are the ones most commonly supported by graphics software of all types (not just image editors).

Prepress preparation

If you are going to send all your images to prepress specialists before publication, this capability is less important to you than if you plan to do the work yourself. Of course, these features become very significant if you are the prepress specialist. If this is the case, you already know what to look for in the program. Just make sure that the program has what you need.

If you don't have a great need for accurate color calibration, make sure that you can use an ICC (International Color Consortium) profile for your display, scanner, and printer. You can then do a reasonable job of calibration by using inexpensive color calibration software, such as EZ Color. Some image-processing programs also are

able to take advantage of Apple ColorSync and Microsoft ICM (Windows 98 or later only) and their compatibility with ICC profiles.

| Cross-Reference | Color calibration and prepress considerations are complex topics. You can find a helpful and comprehensive discussion of them in Chapters 18 and 19. |

Image compositing

All of the features mentioned in the previous sections can help you make smoothly composited images from multiple image files. However, you will be more successful at making realistic images with consistent tonal values and image sharpness if you use a program that renders the composited image from the original files after you've done all the necessary masking, cutting, pasting, resizing, and rotating. If a program has to rearrange the image's pixels after you have already accomplished each of these steps, you simply can't avoid losing a lot of pixel information. Some programs, such as Photoshop 5, let you make a number of transformations (scaling, stretching, rotating, or distorting the image) before rendering the result. However, only programs that let you work with a lower-resolution representation of the original file until rendering time are able to do this as smoothly as possible. Such a capability is often referred to as *proxy editing,* because the file you are performing the work on is a temporary, low-resolution version of the original. (The resolution of the temporary file depends on the zoom level.) Incidentally, a number of image-editing products have been based on proxy editing, such as Live Picture. However, they seem to have faded from the scene.

The Adobe Photoshop Dynasty

I grew up on Photoshop. From the day it was bundled with a scanner and called Barneyscan, Photoshop has been my preferred image editor. Adobe, already the leader in computer graphics software, thanks to its invention of PostScript digital typesetting, bought the program shortly thereafter. The rest is history. Today Photoshop is the bread and butter program used by professional photographers, Web designers, art directors, layout artists, story boarders, and anybody else serious about digital art. However, Photoshop is generally one of many graphics programs that these people use; nearly everyone also uses a vector graphics (drawing) program, a desktop publishing program, and so forth.

Photoshop is king partly because it came first and partly because its interface and mechanisms were brilliantly designed from the beginning. In fact, the design is so good that it has become "the language" of digital photo-manipulation. If you work in Photoshop, most likely anyone that you work with speaks your language. They can read your files without conversion considerations. Furthermore, when you tell them what you did and what needs to be done going forward, they'll know exactly what you're talking about. Finally, no other program has the same authority to enforce color calibration and other pre-press standards that make it possible to accurately predict what the photo is going to look like after publication or fine-art printing.

Recently, Adobe has divided the Photoshop line in two:

✦ **Photoshop professional:** The Photoshop professional series is simply Photoshop as you have always known it, plus whatever enhancements may be added from time to time. Photoshop 7.0 is the current professional version at the time of this writing.

✦ **Photoshop Elements:** The Photoshop Elements series was introduced only a few months ago, but it is already at version 2.0. Elements is perfectly named because it includes almost all the elements of Photoshop that are necessary for competent photo manipulation without the bells and whistles that are essential for production and post-production work.

Adobe Photoshop 7.0

Need to tweak the qualities of a photograph and balance colors for photos before publishing them to a printing press or CMYK proofing printer? Want to automate the procedures that are typical of your photo production process? Want to program new routines for Photoshop that make the use of the product more interactive and tamper proof? Need the power to fine-tune every aspect of a digital image and in more ways than one? Brother (or sister), you need the professional version of Photoshop.

Figure 10-1 shows the user interface for Photoshop 7. The screenshot in this figure was taken in Windows XP, but the Mac OS X version looks nearly identical and can perform the same functions.
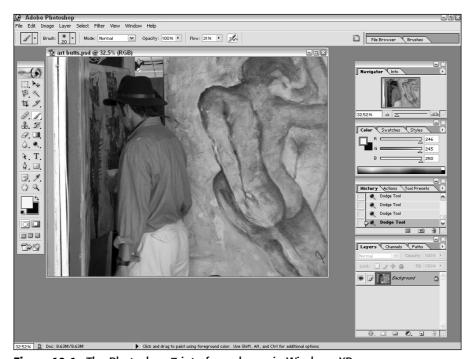
Figure 10-1: The Photoshop 7 interface, shown in Windows XP

Photoshop's most notable features are as follows; those followed by an asterisk (*) are new in Photoshop 7:

✦ Ability to correct perspective and re-render the image while cropping

✦ Scripting*

✦ Automation (Actions and Droplets)

✦ Color Management

✦ Editable Channels and Channel Operations

✦ Highly controllable and editable brushes*

✦ Automatic "healing" of commonly encountered defects

✦ Semi-automatic separation of objects with complex edges from their surroundings

✦ Built-in File Browser*

✦ Complete set of Web editing and optimization tools

✦ Transparent and partially transparent JPEG images for Web use

✦ Customizable and reloadable workspace arrangement*

✦ Built-in natural media paint tools*

✦ Automatic color correction at a single command*

✦ Automatic creation of natural patterns*

✦ Custom meshes in the Liquify command*

✦ Password file protection*

✦ Built-in spell checker*

✦ Automated Picture Package production

✦ Self-publishing Web Gallery templates

✦ XMP Support

✦ Pen tool for vector path drawing

✦ Layer effects

✦ 95 built-in special effects filters

✦ ImageReady

✦ Extremely powerful selection capabilities

✦ Watermarking for copyright protection

✦ History palette

✦ Savable tool presents

Adobe Photoshop Elements 2.0

Photoshop Elements is the perfect product for someone who is getting into digital photography or a similar graphics field but who also wants simplicity in his or her image-editing program. Photoshop Elements is also the ideal training ground for those who want to have a high level of competency when they eventually move up to the professional version of Photoshop, which is about six times the price of Elements. The interface for Photoshop Elements 2.0 is shown in Figure 10-2. Although the interface is similar to Photoshop 7, the Quick Fix dialog box shown in Figure 10-2 is unique to Photoshop Elements. On the other hand, the Photoshop Elements File Browser is now virtually identical to the Photoshop 7 File Browser.
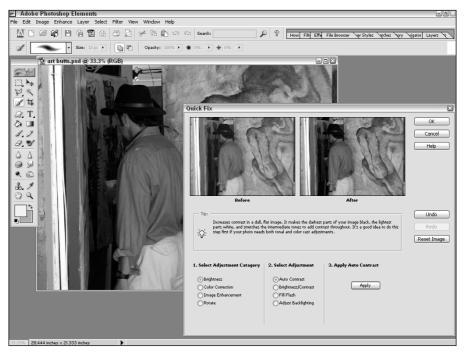
Figure 10-2: The Photoshop Elements interface

Actually, Photoshop Elements has some qualities that Photoshop 7 doesn't, which fall into the category of features that are essential to automatically correcting the mistakes most often made by digital photographers:

✦ **Quick corrections:** With one click or command you can correct contrast, gamma, and color balance.

✦ **Remove red-eye:** You can brush out that awful red-eye that occurs when the on-camera flash fires directly into the pupils of the subject's eyes.

✦ **Routines:** Adobe realizes that Photoshop has a lot of capabilities that may take a beginner some time to master, so the program performs pre-programmed routines (similar to what you might produce yourself using Photoshop Actions); to access them, simply choose one from a thumbnail menu.

✦ **Recipes:** Photoshop's Recipes are a lot like the "wizards" used in Microsoft Word. They take you by the hand and give you instructions while you click your way through performing various tasks. The dialog box for one of these Recipes is shown in Figure 10-3.
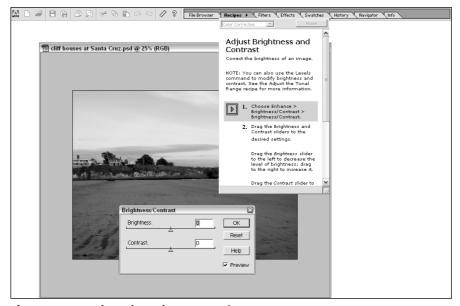
Figure 10-3: A Photoshop Elements Recipe

Another feature that makes using Elements much more transparent than using Photoshop—despite the similarity of features and interface—is the use of thumbnails in dialog boxes for executing plug-ins and layer styles. When you select a tab in the palette well at the right end of the Options bar, you can immediately see the effect of any of the filters by looking at the thumbnail, as shown in Figure 10-4. You can apply the filter in one of three ways:

✦ Drag the thumbnail onto the image

✦ Click the Apply button

✦ Double click the thumbnail itself

In all three instances, you get the Options dialog box for that particular filter so that you can choose which settings to use.
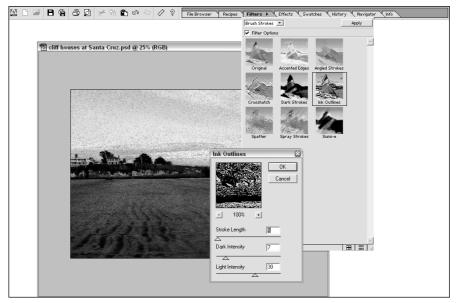
Figure 10-4: The Filters thumbnail dialog box

The most notable features in Photoshop Elements are as follows (those followed by an asterisk (*) are new in Photoshop Elements 2.0):

✦ The majority of Photoshop's features and commands

✦ Quick Fix commands*

✦ Hints

✦ Clickable layer styles

✦ Filter thumbnails

Power for Less

Photoshop Elements has lots of direct and formidable competition in its price range. The best-sellers among these are JASC PaintShop Pro, Ulead PhotoImpact, Corel PHOTO-PAINT 10 (which is no longer available as a stand-alone product, only as part of a bundle with CorelDRAW), and Corel's (formerly Micrografx) Picture Publisher 10.

JASC Paint Shop Pro 7

Paint Shop Pro has long been a favorite of those who want near-professional features and a well-rounded collection of useful effects and utility features. The user interface feels comfortably familiar. However, if you normally use Photoshop, you may need some time to get used to it. Paint Shop Pro sells for $99 if you download it and for $109 boxed. The Paint Shop Pro 7 interface is shown in Figure 10-5.
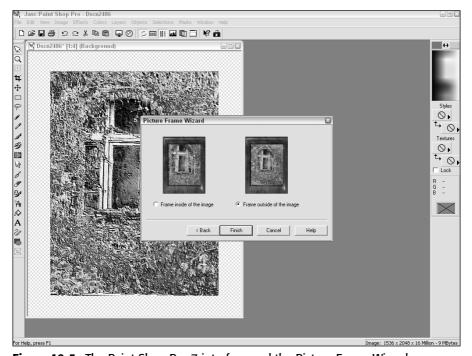
Figure 10-5: The Paint Shop Pro 7 interface and the Picture Frame Wizard

Note I really like Paint Shop Pro's built-in screen capture program, which allows me to capture screens while I'm editing photos.

The following are some notable features of Paint Shop Pro:

✦ **Layers and channels:** The program allows you to work in layers, split and re-combine channels, and do channel math operations for special color effects.

✦ **Red-eye removal:** Paint Shop Pro has the quickest and most automatic red-eye removal I've ever seen in an image editor.

✦ **Color balance and temperature:** You can correct color balance by color temperature using an interface and method that I haven't seen in other programs. Figure 10-6 shows the Automatic Color Balance dialog box.
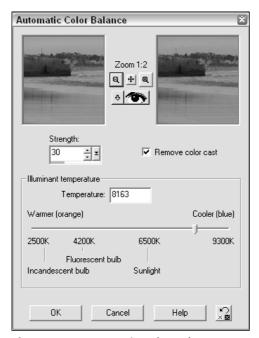
Figure 10-6: Automatic Color Balance

✦ **Photo restoration:** Paint Shop Pro offers outstanding photo restoration procedures, such as scratch removal that doesn't blur the image because it only fills the radically darker or lighter areas within a selection. A single command evens out the exposure of faded areas of the photo.

✦ **Framing tools:** If you like to frame your Web portfolio images, Paint Shop Pro comes with very nice automatic picture framing tools.

✦ **Multiple pictures:** You can create great scrapbook pages by using the multiple pictures feature. This feature is very easy to use and lets you scale and rotate the images interactively. You don't have to rotate copies of the pictures beforehand, as you do in Photoshop, in order to have the face in the desired direction. (Photoshop rotates pictures so that they fit within the pre-defined layouts.)

✦ **Gradients:** You can paint with a gradient, in which case the color changes with the same sequence and blend as the chosen gradient.

✦ **Photo sprayer:** This is a brush that sprays photos, which is an idea "borrowed" from Corel Painter. Photo sprayers like this are very useful for performing such manipulations as populating a field with flowers or putting leaves on a barren tree branch. They're also useful for putting fanciful borders around invitations.

✦ **Vectors and text:** Not only does Paint Shop Pro have a built-in vector-drawing tool, but you can add text that follows the path that you draw. So it's a piece of cake to do all sorts of text layouts that follow an exact path. (Photoshop lets you shape text in a number of ways, but you can't follow an exact path except by sheer luck.)

✦ **Support for Photoshop plug-ins:** Any Photoshop-compatible plug-in will work with this program, including software such as Kai's Power Tools 3 that no longer works in Photoshop 7.

✦ **Web graphics:** Web graphics preparation isn't as controllable in Paint Shop Pro as it is in ImageReady, but it's all a lot easier. You can optimize GIFs, JPEGs, and PNG files; do automatic simple animations of static subjects; and do image slicing, image mapping, and rollover effects.

Corel PHOTO-PAINT 10

Corel PHOTO-PAINT has, until very recently, been available as a stand-alone product as well as being bundled with CorelDRAW. Now that these programs are shipping for both Macintosh and Windows platforms, Adobe has a fierce competitor on two fronts. Corel PHOTO-PAINT has a sizeable installed base, thanks to its association with CorelDRAW, and CorelDRAW was the leading Windows illustration program until Adobe Illustrator and Freehand came on the scene. Even now, CorelDRAW is a strong contender and has become more and more established among Macintosh users. The good news about all this is that if you're a CorelDRAW fan, PHOTO-PAINT costs you nothing. To look at it another way, if you don't have an illustration program, buy CorelDRAW to get a strong and useful image-editing program.

PHOTO-PAINT's interface has become increasingly integrated with the CorelDRAW interface, making it unique. You're not likely to have much trouble recognizing the function of the tool icons, but learning the command menus may take a bit longer. You can see the Corel PHOTO-PAINT 10 interface in Figure 10-7.

Note In PHOTO-PAINT, layers are called *objects.* As in Painter, the layers are trimmed to include only the visible pixels (unless you force the program to do otherwise).
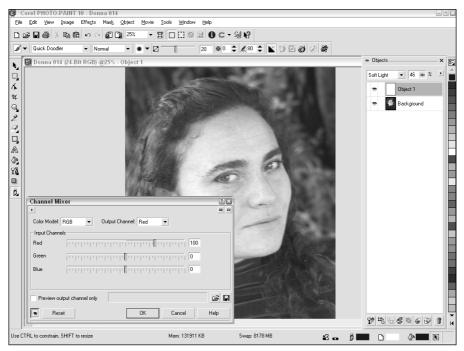
Figure 10-7: The PHOTO-PAINT 10 interface, showing the Objects docker (palette) and the Channel Mixer

The following are some of PHOTO-PAINT 's notable features:

✦ **Natural-media brushes:** PHOTO-PAINT offers a broadened collection of natural-media brushes. You can find numerous variations on each brush in a drop-down menu in the Brush Tools palette.

✦ **Clone brush:** The Clone brush can be either aligned or not. You can also clone from a saved file, so you can imitate the effect you get when you clone to a new layer in Painter.

✦ **Lenses:** PHOTO-PAINT has a lens feature that is equivalent to Photoshop's Adjustment layers. PHOTO-PAINT has more types of lenses than Photoshop has Adjustment layer types. Many of the additional types let you create filter effects, such as impressionist brush strokes or noise.

✦ **Image adjustment:** Image adjustments are even more powerful than in Photoshop. You can also run plug-ins from inside the Image Adjustment dialog boxes, so you can filter and make the adjustment at the same time. PHOTO-PAINT is not compatible with Photoshop plug-ins, but its native effects are more versatile and more powerful than most of those in Photoshop — particularly artistic and 3-D filters.

✦ **Special effects:** PHOTO-PAINT also provides some amazing special effects. For example, you can make it rain or snow and even fill the sky with stars. Almost all of PHOTO-PAINT's special-effects filters let you see a preview of the image before you have to commit. Furthermore, almost all filters present you with a wide range of adjustments, so you have powerful control over noise patterns, line thickness, and just about anything else you can think of. If you're a professional illustrator or need to do a variety of special effects, you may well find it worth your while to purchase PHOTO-PAINT 10 for its special effects filters alone. At $99, this program costs less than most sets of Photoshop filters.

✦ **Color management:** The color management capabilities in Corel PHOTO-PAINT are not only extensive, but feature an interface that makes color management significantly easier to understand and to use than any of its competitors. You can see the basic interface for this in Figure 10-8.
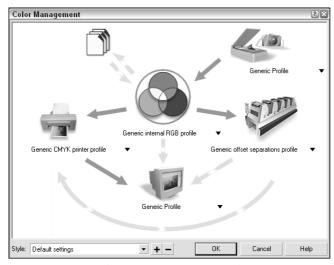
Figure 10-8: Corel PHOTO-PAINT's new color management dialog box

✦ **Keyboard shortcuts and macros:** You can assign keyboard shortcuts to any PHOTO-PAINT tool or command. You can also customize palettes and tool-bars. PHOTO-PAINT also has a rich macro recording language; you can save macros and play them back on any file. PHOTO-PAINT also uses AppleScript and Action Script as its scripting languages.

✦ **Pen tool:** Use this tool for drawing and saving vector shapes. You can automatically convert these shapes to selections.

✦ **Noise lens:** PHOTO-PAINT's Noise lens is the best tool that I've found for inter-actively creating grain patterns that will match another area of the image.

✦ **History brush:** This tool lets you paint from a previous state of the image.

✦ **Object nozzle:** This tool lets you paint with previously selected and defined objects, such as raindrops, flowers, blades of grass, etc.

✦ **Web graphics:** PHOTO-PAINT can convert any image to any of the three Web image file formats: GIF, JPEG, or PNG. You are given a fair degree of control over the appearance of optimally compressed files. You can even preview your image while changing settings so that you can see the result before you actually save the file.

✦ **Image maps:** You can also make image maps in PHOTO-PAINT. The method is a bit strange: You assign links to the objects (layers) in an image. If you want to cut different areas of a photograph into an image map, you simply place each image on a different object level, click a tab, and assign a URL. The program also provides the means to publish your image maps as either client-side or server-side, or both.

✦ **Movies:** PHOTO-PAINT lets you create movies. You can use an image as a background and layer objects as the moving "actors." You can then designate a number of frames and place the objects in the proper location in each frame to give the illusion that the objects are in motion when the movie is played back. You can save movies in either Corel's movie format or as animated GIFs.

Corel Picture Publisher 10

Unlike PHOTO-PAINT 10, Picture Publisher 10 is still a separate product, but Micrografx, the original publisher, is now a division of Corel. You can reach the Micrografx Web site through the Corel site, or you can just save yourself the time by going to www.micrografx.com.

Picture Publisher comes in two versions—Professional Edition and Digital Camera Edition. The Professional Edition is $149, which is a bit higher than the target price for this group. On the other hand, it has some very valuable features, such as the ability to handle up to 64-bit image files in CMYK mode and to edit portions of the image separately. This second feature means that you can edit very large files without feeling a memory crunch. The Kodak Color Management system is built-in as well, so if you need to do careful calibration and prepress work, you may be able to get by with a much less expensive program than Photoshop 7.

One really unique feature of Picture Publisher is a filter that lets you simulate depth-of-field effects using an interactive dialog box. You pick the 35mm lens equiv-alent focal length, which can be made manually adjustable, choose the amount of light falloff from foreground to background, and then drag the cursor to set a target where you want the focal point of the picture to be. If you have preview turned on, you immediately see the result of your adjustments in the dialog box. You get a better picture of this feature in Figure 10-9.
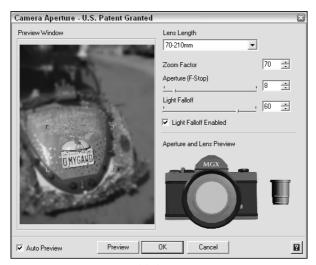
Figure 10-9: Picture Publisher Camera Aperture
dialog box

If you want to stitch images together to make panoramas or create high-resolution images from a grid of side-by-side photos, Picture Publisher makes this process quite easy. You open the images at the same time, arrange them in the workspace so that they are in the required order and position, and then place markers at the points where the images are meant to overlap. You then ask the program to stitch, and the rest is done automatically. The program can rotate and distort images to line up; it can also adjust the exposure of images so that all stitched panels are of the same brightness and contrast.

Some of the other features of Picture Publisher include the following:

✦ **Photo Album:** This feature lets you create Web portfolios, scrapbook pages, burn CD-ROMs and screen on-screen or Web slide shows.

✦ **Lighting and particle effects:** You can generate lighting and particle effects using Picture Publisher. Lighting effects are generally found only in much more expensive products such as Photoshop 7 and procreate Painter.

✦ **Plug-ins:** This program includes a very large selection of built-in plug-ins.

✦ **Batch correction:** Batch correction allows you to make the same correction on a whole series of photographs. This is a nearly indispensable capability when you have to produce batches of buttons for a Web site or have to correct dozens of pictures from a shoot that uses the same subject in the same location and lighting conditions.

✦ **Edge Wizard:** I really like this feature, because you don't have to purchase a separate plug-in program in order to use it. The Edge Wizard lets you frame your picture with 35mm film sprockets, ragged edges, picture frames, and a large number of other effects. The Edge Wizard is shown in Figure 10-10.
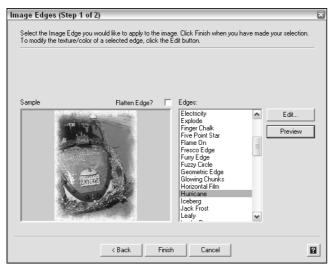
Figure 10-10: One of the dozens of edge styles built into
Picture Publisher 10, shown inside the Edge Wizard dialog box

Ulead PhotoImpact 7

Ulead makes two image editors:

✦ **PhotoImpact 7:** This is a small office/home office-level product priced at
$89.00.

✦ **Photo Express:** This is an entry-level product priced at $29.95, which is
described later in this chapter.

Ulead's PhotoImpact carries on the tradition of mid-range products by offering fea-
tures that are otherwise found only in more expensive programs or in third-party
add-ons. All the basic point-and-click imaging cures are found here: instant color
and exposure correction, a red-eye cure, and dust and scratches filters. You can
also batch process groups of files. When you combine that capability with the
ability to make flexible layout contact sheets and scrapbook pages, you have an
excellent candidate for quickly processing multiple images from the same shoot for
nearly instant review and presentation. You can also do project printing, such as CD
labels, CD cover sheet thumbnails, and stickers. You can see the PhotoImpact 7
interface in Figure 10-11.

One very nice feature of PhotoImpact is a built-in procedure for correcting the lens
distortion that is so prevalent in — but not exclusive to — beginner-to-midrange
digital cameras. The results of using this feature are shown in Figure 10-12.
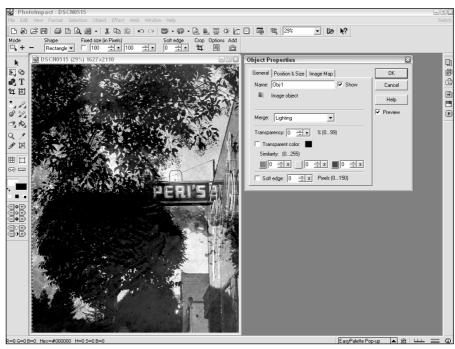
Figure 10-11: The PhotoImpact user interface, and the Object Properties dialog box
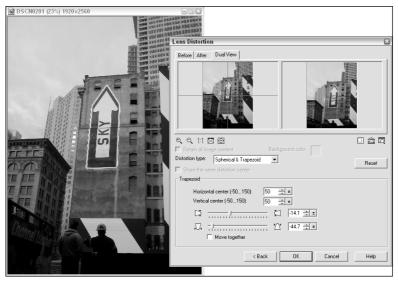
Figure 10-12: This filter interactively fixes both barrel distortion and lens distortion.

Another very handy feature of PhotoImpact, which is also found in Elements 2.0, is the ability to automatically e-mail a picture. Within a minute or two, you can download the image, auto-correct it, crop, and fix lens distortion. You then click a button that resizes the image, optimizes it for the Web, and brings up an e-mail dialog box that lets you write a note with the photo attached, as shown in Figure 10-13.
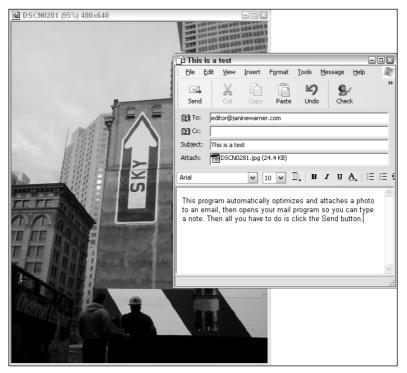
Figure 10-13: It is easy to send an image in an e-mail with PhotoImpact.

Speaking of Web pages, PhotoImpact is highly effective at optimizing Web image performance and creating interactivity effects such as pop-up menus, mouse-over text effects, and a built-in animation tool. It even includes a built-in, what-you-see-is-what-you-get Web page editor that even lets you incorporate Flash and video files into the Web page.

PhotoImpact 7 also has vector tools that let you draw shapes and then automatically enhance them with fill and 3-D effects. You can also place text on a vector path. These effects are especially useful for creating flyers, business cards, and the like. More importantly, they're very handy for creating quick Web page art.

Image Editing for Beginners and Special Effects

The programs in this section are aimed primarily at novices and casual hobbyists, but they all do the essentials. More importantly, many of them create special effects, such as printing gifts and cards and picture packages that are more versatile than in more expensive programs. Because their prices are so low and they offer these extra features, they are often purchased by pros as well.

Corel Picture Publisher Digital Camera Edition

The Digital Camera Edition of Picture Publisher has many of the same features as the Professional version. However, the features have been pared down to make the program a bit easier to use, more focused on processing pictures, and less focused on creating technical illustrations. For $100 or less, the Digital Camera Edition does most of what the Professional version does. The Professional version is covered earlier in this chapter, so in this section I outline what the Digital Camera Edition *doesn't* offer:

✦ Customizable gradients, effects, and lighting effects

✦ CMYK support

✦ Kodak Color Management

✦ Bevel factory (a filter set for making beveled-edge letters and buttons)

✦ Web graphics tasks, such as rollovers, image slices, and optimization

Microsoft Picture It!

Three qualities really make Picture It! 2002 stand out:

✦ **Picture It! has the most easily understood interface.** This is because the designers didn't feel that you had to get entirely away from the look and feel of a computer. So if you've used a computer, you'll still know how to open and save a file without having to crack the manual to find out which magical combination of buttons to click.

✦ **Picture It! offers fairly decent performance.** It's not nearly as quick as Photoshop, but you won't find yourself impatiently drumming your fingers nearly as often as you will with Soap, FlashBox, or PhotoDeluxe.

✦ **Picture It! has the best combination of home and business features.** For example, it includes templates for business cards, flyers, and certificates.

Opening image files in Picture It! isn't a magical or secret process; you simply use the File ➪ Open command on the menu bar. As soon as you do so, you're presented with a wizard-type interface that lets you open files from any type of a drive attached to your computer. All the latest trends in file formats are covered: Photo CD, TIFF, GIF, JPEG, PNG, and Macintosh PICT. You can also open and automatically rasterize several vector file formats: AutoCAD DXF, generic EPS (PostScript), CorelDRAW, and enhanced metafiles. You can see the Picture It! user interface in Figure 10-14.

Figure 10-14: The Picture It! user interface

> **Note** Picture It! supports direct input from cameras that have a Photoshop plug-in module installed and from scanners with TWAIN interfaces.

You can do all image processing either automatically by adjusting sliders while previewing the results in the workspace, or by brushing the adjustments into specific areas. You can use the image processing controls for brightness/contrast, color balance, and transparency. You don't have to turn previewing off and on — it's always working.

This is a two-disk set, so you have room for hundreds of photographs, including skies and backgrounds. The program also uses layers, and you can see thumbnails of each layer as you work. You can drag layers to reorder the stack and you can switch from working on one layer to working on another by clicking the target layer's thumbnail.

Picture It! also has an edge-finding Lasso that should be imitated by everyone. It drags a marquee to show the width of the pixels that it uses to search for an edge. It's a visual aid that is a big help when it comes to selecting exactly the edge pixels that you want. Of course, no automatic tool is perfect.

The dust and scratches feature automatically removes dust spots, scratches, red-eye, and wrinkles. Picture It! also has a Clone tool, so you can remove unsightly trash and telephone lines from your pictures. Brush sizes are the same, regardless of zoom level. This means that you have to zoom way out to make very large strokes, or zoom way in to make very small ones.

Picture It! doesn't create any permanent thumbnail files or contact sheets. You do see thumbnails of any compatible graphics files as soon as you open a folder that contains them.

Framing is a piece of cake. You choose the frame from a visual catalog, and then drag the image from the filmstrip to the frame. The image is automatically placed behind the frame. All you have to do is scale the image by dragging handles that appear automatically. Unfortunately, the frame doesn't rescale to fit the photo. If the image is too small, you have to stretch it to fit — losing detail in the process.

Picture It! contains quite a few templates that are useful for business. These include business cards, several types of business announcements and greeting cards, a selection of flyers, and some certificates.

Picture It! lets you automatically send and e-mail greeting cards. You can also place any number of the images on the filmstrip into a slide show and then e-mail the slide show.

Ulead Photo Express

Photo Express (the full version) sells for a mere $12.95 and has a full range of quick-edit features:

✦ **E-mail attachments:** The automatic attachment of photos to e-mails featured by its big brother Ulead PhotoImpact 7 is also available in Photo Express.

✦ **Visual browser:** Photo Express has a visual browser that lets you open files visually.

✦ **Imported files:** You can import from a full range of scanners and cameras and even capture stills from video cameras.

✦ **Special effects:** This program includes an extensive set of special effects filters that let you create weather effects in addition to the more familiar artistic and warping effects found in other programs.

✦ **Specialty printing options:** The features that may convince you to easily spend the money for this program are it's specialty printing options (see Figure 10-15), which include CD labels and covers, fabric transfers, and even over-sized multi-sheet posters from your desktop printer.

✦ **Photo sharing on the Web:** Finally, this program includes extensive options for sharing your photos on the Web, with the ability to create Web pages, Web greeting cards, and make use of online image sharing sites.

✦ **Panoramas:** Photo Express also includes a separate program for stitching 360-degree panoramas.
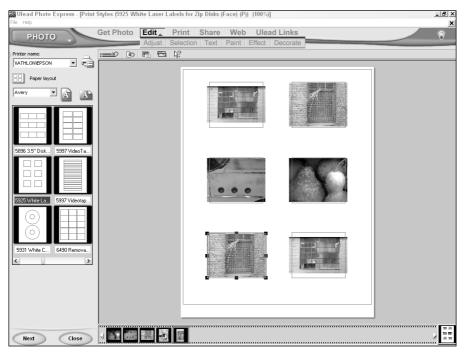
Figure 10-15: The Photo Express screen showing the project printing dialog box

ArcSoft PhotoImpression 4.0

Unlike most of its competition, PhotoImpression 4.0 runs on both Windows XP and Mac OS X. Most all of the standard photo-editing commands are available, as well as red-eye removal and a stitching capability. You also get multi-layer capabilities, a visual album for organizing and locating images, macros, and batch processing.

This is certainly one of the easiest and most transparent beginner programs around. Try it — you'll love it. The user interface is shown in Figure 10-16.

Figure 10-16: The PhotoImpression interface

MGI PhotoSuite 4

PhotoSuite 4 has a great interface for those who are most concerned with ease of use. You choose almost every command from a button menu on the left. At most, you may be presented with a few adjustment sliders, check boxes, and radio buttons.

PhotoSuite 4 includes a program that makes photo-mosaics. (Ulead calls these photo-mosaics *photo-tapestries*.) *Photo-mosaics* are images that are made up of a mosaic of small images, as shown in Figure 10-17. It is as if each pixel is an image within the image. All it takes to create the "tapestry" is to collect the photos by adding them to the tapestry title through the image browser and then choose a number of images to use in describing the tapestry and a size for the tapestry. Then you just click the Create button.
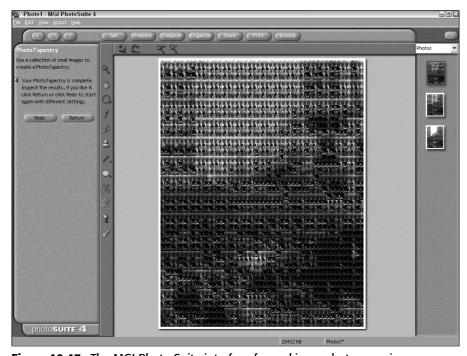
Figure 10-17: The MGI Photo Suite interface for making a photo-mosaic

PhotoSuite 4 also hosts one of the best and easiest-to-use panorama stitching programs that I've come across. You can instantly see how easy it is to use by taking a look at the screen shot shown in Figure 10-18. I actually took the pictures in my studio during the East Bay Open Studios showing last year with a handheld camera using only daylight.

Cross-Reference   Chapter 16 explains how to shoot a panorama correctly so that the image stitches together seamlessly.
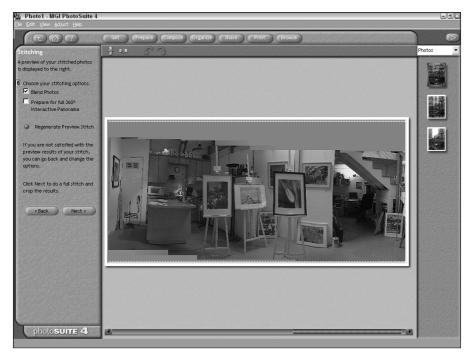
Figure 10-18: A hand-held panorama stitched in MGI PhotoSuite 4

Summary

In this chapter, I introduced you to the special qualities of the most prominent choices in image-editing software. With digital cameras now consuming nearly 30 percent of all new camera sales (exclusive of disposable cameras), it's doubtless that new image-editing software will arrive as fast as your head can spin. So, if you're on a budget, start with the program that came with your camera. As soon as you're dissatisfied with what you can do (or with how that program does it) and you can invest a bit more, move up to Photoshop Elements. You'll be able to do most everything the pros can do, and you'll get pertinent training for the day when you become totally consumed by digital photography. When that day comes, move up to Photoshop. By then, you'll be making so much money that you can afford to spend the pennies that the other programs charge for being able to contribute their unique talents to the interpretation of your digital photos.

✦ ✦ ✦

Image-Editing Software

Part IV is no longer simply a catalog of what's available in image-editing software. I've categorized the capabilities of the most popular of the image-editing programs into the various types of jobs that they perform and even provided specific lessons that show you how to do some particularly cool and useful things. Using image-editing software is such a rich and complex topic that I've had to devote four chapters to the subject. The first chapter covers essential image-editing procedures, or the procedures that you use every day. Then I discuss how to achieve the most commonly needed special effects with procedures that you can use in either Photoshop or Photoshop Elements. Next, I cover more advanced, or pro-level, editing procedures — the effects that require an advanced professional tool such as Photoshop 7. Finally, you get to find out how some of today's great artists are expressing themselves through paintings based on photographs.

Essential Image Editing

The members of the Adobe Photoshop family of editors are the undisputed champions of image-editing products among professionals and serious digital-photography addicts. There are two current versions:

- ✦ **Photoshop 7:** This program is for power-hungry die-hards who stop at nothing when it comes to the power to manage, tweak, express and publish their photos.

- ✦ **Photoshop Elements 2.0:** This program is for those needing a less expensive and demanding subset of the same tools that at least covers the basics.

The second of these two products is the topic of this chapter. You should know, however, that you can also do everything in this chapter in Photoshop 7 — more often than not, in exactly the same way. When that is not the case, I point out the differences so you can take advantage of the tutorials in this chapter, regardless of which version of the Photoshop tools you're using.

Finally, I don't mean to imply that Photoshop tools are the *only* worthy image editors. In fact, after spending most of the last two decades reviewing image-editing software I have to say that I've rarely met an image-editing package that I didn't like in at least some respect. Most functionality in these chapters can be accomplished in any of the established image-editing programs.

Employing Quick Fixes

This section is devoted to operations that anyone, regardless of experience, can manage by loading nearly any modern image-editing program — and then choosing a single menu item, clicking a button or two, or pressing a key combination.

Best of all, these techniques almost always do an adequate job if you can settle for less than perfection—for example, when lack of experience or lack of time prevents you from using a more complicated or advanced technique.

Although nothing can really substitute for the specific camera settings that most flatter the final photograph, your digital darkroom does give you a big advantage when it comes to recovering from mistakes. For example, instant exposure correction can give you a picture that is as technically as perfect as possible, given the amount of data captured. Figure 11-1 shows an example of such a correction.

Figure 11-1: The original exposure (left) and the result of the Auto Levels command in Photoshop Elements (right)

Photoshop Elements has one of the coolest instant-correction commands in any image-editing program: Quick Fix. This command brings up a dialog box that lets you instantly see "Before" and "After" images for several categories of Quick Fixes. In the next few sections, I show you how to make the instant corrections that are available in the Quick Fixes dialog box. Each exercise uses a specific file on this book's CD-ROM that dramatizes what these commands specifically do. (Of course, you can use your own files if you'd rather.) At the end of each exercise, I give you alternative commands for doing the same thing through an individual menu command in *both* Photoshop Elements 2.0 and Photoshop 7.

Using Auto Contrast

If you like the approximate color balance (overall color shade or tint) of your image — but find the contrast between shades of gray too obvious or too subtle — then Auto Contrast is the Quick Fix to use. (In case you're wondering, Auto Contrast does change the color balance, but doesn't do so as accurately as the Color Levels command described later in the chapter.)

1. **Open the file** `Alameda Beach-Winter` **from the CD-ROM.**

2. **Choose Enhance ➪ Quick Fix.**

   The Quick Fix dialog box appears, as shown in Figure 11-2.
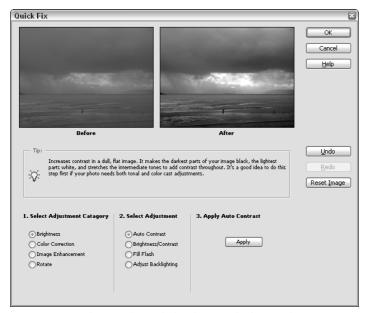
Figure 11-2: The Quick Fix dialog box, with the result of Auto Contrast showing in the preview window

3. **Select the Brightness radio button in the Adjustment Category column.**

4. **Select the Auto Contrast radio button in the Select Adjustment column.**

5. **Click the Apply button.**

   You see the result of the application in the right hand preview window labeled "After."

6. **If you are through making Quick Fixes, click the OK button.**

Alternatively, you can add other Quick Fixes to the result you already have before you finalize the result in your image. Also, if you don't like the results you see, then at any point before you click OK, click the Reset Image button. It gives you the choice to start over or cancel.

Tip   It is best to add other Quick Fixes *before* you click the OK button. Doing so allows Photoshop Elements to do all the necessary recalculation on the original image in one step, which reduces the loss of image information.

The Auto Contrast command appears on its own in both Photoshop 7 and Photoshop Elements 2.0; you can activate it by pressing Opt/Alt + Shift + Cmd/Ctrl + L. To reach the menu command in Photoshop Elements, choose Enhance ➪ Auto Contrast. To reach the menu command in Photoshop 7.0, choose Image ➪ Adjust ➪ Auto Contrast.

Note   Many commands on the Photoshop Elements Enhance menu are also available on the Photoshop 7 Image ➪ Adjust menu.

Using Auto Levels

The Auto Levels command automatically adjusts Levels so the colors in each channel stretch from absolute black to absolute white, which is the same principle as Ansel Adams's famous "Zone System." In the process, it also corrects color by balancing each primary channel. In the section called Using Levels, below, I show you how to do this manually so you can make your own decisions about color balance and give an individual image the "feeling" you want it to convey. Here's how you do it with a Photoshop Elements Quick Fix:

1. **Open the file** `Alameda Beach-Winter` **from the CD-ROM.**

2. **Choose Enhance ➪ Quick Fix.**

The Quick Fix dialog box appears, as shown in Figure 11-3.

3. **Select the Color Correction radio button in the Select Adjustment Category column.**

4. **Click the Apply button.**

Before you click OK to finalize the operation, you may want to see what happens if you go back and add the Auto Contrast command to the mix.

Figure 11-3: The Quick Fix dialog box showing the correct settings
for Auto Levels correction

The Auto Levels command also appears on its own in both Photoshop 7 and
Photoshop Elements 2.0, and you can execute the command by pressing Shift +
Cmd/Ctrl + L. To reach the menu command in Photoshop Elements, choose
Enhance ➪ Auto Levels. To reach the menu command in Photoshop 7.0, choose
Image ➪ Adjust ➪ Auto Levels.

Correcting color

If you want to further color correct the image, you can click the Color Balance
and Hue/Saturation buttons in the Quick Fix dialog box, which appears when you
choose Enhance ➪ Quick Fix. When you click the Auto Color radio button, you can
see the result in the After preview window. If you like what you see, click the Apply
button. If you click the Hue/Saturation radio button, the Hue/Saturation dialog box
appears. However, because you're working in Quick Fix mode, these controls
(Apply Hue/Saturation) appear directly in the third column of the dialog box,
as shown in Figure 11-4.
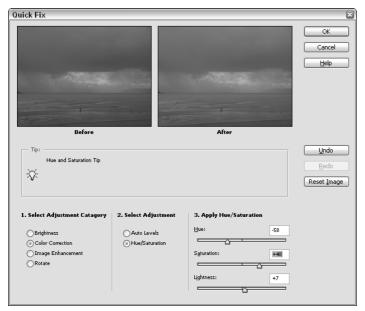
Figure 11-4: The Quick Fix dialog box, showing the proper settings for changing Hue and Saturation

You can adjust several settings in the Hue/Saturation dialog box:

✦ **Hue:** To change the overall color tint (color balance) of the image, drag the Hue slider. After you stop adjusting the slider, give the program time to recalculate the color balance so you can preview the effect. You can keep changing this setting until what you see pleases you.

✦ **Saturation:** When you've got the tint the way you want it, drag the Saturation slider until the predominant colors are as intense as you'd want them to be.

✦ **Lightness:** Finally, you can change the overall brightness of the image by dragging the Lightness slider above the midpoint to brighten the image or below the midpoint to darken it.

After you've finished adjusting the color, you can either add another Quick Fix setting or click OK to permanently alter this copy of the image.

If you're using Photoshop 7, you can reach the Hue/Saturation dialog box directly by choosing Image ➪ Adjust ➪ Hue/Saturation and then adjust the three sliders as just described. The shortcut to the Hue/Settings dialog box is Cmd/Ctrl + U.

Note One important difference between Photoshop Elements and Photoshop 7 is that Photoshop 7 (and earlier professional versions of Photoshop) have buttons in the dialog box that let you Load or Save the settings you've just made. You can then name these settings so you can load and apply them to a whole series of photographs.

Using Fill Flash

Sometimes you have to take a picture when the light is too contrasty and you just don't have an external flash that's bright enough to fill the shadows as much as you'd like. Even more likely, you have to shoot a scene in bright sunlight that's too high in contrast for any flash to fill the shadows effectively (or, more importantly, evenly). Photoshop offers several ways to correct this problem, but none as easy as the Fill Flash command in Photoshop Elements, which can also be accessed by choosing Enhance ⇨ Fill Flash or by combining the Fill Flash with the other effects in the Quick Fix dialog box, as shown in Figure 11-5.

1. **Open the file** `Jane's Window` **from the CD-ROM.**

   Notice that the hills and tree branch are in silhouette because I wanted to expose for the color in the sunset sky. I might have been able to get a little detail in the tree branches with fill flash, but detail on the hillside would've been hopeless in any case.

2. **In Photoshop Elements, choose Enhance ⇨ Quick Fix.**

   The Quick Fix dialog box appears.
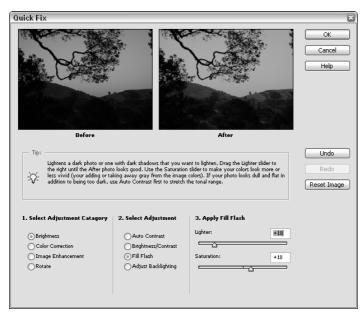
Figure 11-5: The Quick Fix dialog box, showing the correct Fill Flash settings for this particular image

3. **Select the Brightness radio button (unless it's already on).**

4. **In the Select Adjustment column, select the Fill Flash radio button.**

The Fill Flash dialog box appears in the third column.

5. **Drag the Lighter slider just to the point where the shadows show enough detail.**

Be careful not to set the fill brightness so high that it creates objectionable artifacts (noise) in the lighter portions of the image.

6. **You may want to drag the Saturation slider to the right until the shadow detail takes on a more lively appearance.**

This technique is often useful because the objects in very dark shadows have been so compressed in their brightness range that they may appear flat and lifeless, lacking in color intensity. Pumping up the saturation corrects that problem, and if you do it here, you won't have to do it later in a separate step.

7. **When you like what you see, either click OK to complete the operation or continue to make other Quick Fixes for this image.**

An alternative to the Fill Flash command

If you're working in an older version of Photoshop that has no Fill Flash command per se, you can still accomplish the same thing by using one of my favorite tricks (especially if you're using Photoshop Elements). Here's the advantage: You can control the amount of "fill flash" on any given object by painting a darker or lighter level of gray on the fill-flash layer that you create in the upcoming steps. Another advantage is that as long as you don't merge the fill-flash layer or flatten the image, you can change the brightness of the fill flash at any time. This is very useful if you might later add another object on a layer above the fill-flash layer; the composite image is likelier to look realistic. Here's how it's done in Photoshop:

1. **Open the file** Jane's Window **from the CD-ROM.**

2. **Make sure the Layers palette is visible.**

If necessary, choose Window ➪ Show Layers.

3. **Make sure the layer you want to fill-flash is selected, and then click the New Layer button at the bottom of the Layers palette, as shown in Figure 11-6.**

A new, transparent, layer appears above the currently selected layer.

4. **Choose Softlight from the Blend Mode menu in the layers palette.**

5. **Choose Edit ➪ Fill.**

The Fill dialog box appears, as shown in Figure 11-7.

Figure 11-6: The Layers palette, shown with the proper settings for this exercise
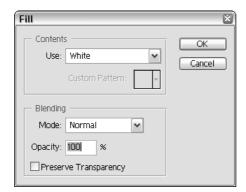
Figure 11-7: The Fill dialog box

6. **Choose White from the Contents menu, Normal from the Blend menu, enter 100 in the Opacity field, and then click OK.**

   The image immediately shows the maximum amount of fill-flash effect.

7. **To lower the intensity of the fill-flash effect, drag either the Opacity or the Fill slider until you like what you see.**

   To put the slider on-screen, click the down arrow to the right of the field. If you don't feel you need to lower the brightness of the fill on any of the objects in the scene, you can stop here.

8. To darken (burn in) specific fill areas, choose a 50% gray as your fore-ground color.

Click the foreground swatch to bring up the Color Picker dialog box, which is shown in Figure 11-8.
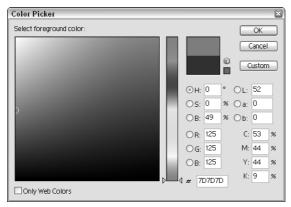
Figure 11-8: The Photoshop and Photoshop Elements color pickers are identical.

9. Enter 125 into each RG and B field and click OK.

The foreground color is now just slightly lighter than 50% gray.

10. Choose the Paintbrush.

11. In the Paintbrush Options Bar, choose the brush size you want to retouch with and its softness from the Brush palette.

You access the brush palette by clicking the down arrow just to the right of the Brush Style icon. Drag the slider to choose the brush size you want; choose the stroke style from the visual menu.

12. Stroke in the image to darken the areas of the fill that you want to darken.

You can change the degree of darkness by changing the opacity of the stroke in the brush's Options Bar.

> **Note**
>
> I recommended gray rather than black for the brush color because it's easier to make the change in fill intensity more subtle. You can, however, use black and simply use the Opacity slider to control the intensity. There is no absolutely right or wrong way.

Correcting backlighting

Correcting washed out (blocked up) highlights can be accomplished by using the Correct Backlighting command in Photoshop Elements 2.0, but it can also be done with the Quick Fix dialog box. You can use this technique to achieve effects like dramatizing the sky at sunset.

Note   Correct Backlighting cannot cure the problem of completely blocked (absolutely white) highlights. The highlights must contain at least some color.

1. **Open the file** `Jane's Window` **from the CD-ROM.**

2. **In Photoshop Elements, choose Enhance ➪ Quick Fix.**

   The Quick Fix dialog box appears.

3. **Select the Adjust Backlighting radio button.**

   The Backlight dialog box appears in column three.

4. **Drag the Backlighting slider to the right — about one-third of the way.**

   You want the darkness of the sky to match the darkness in the original.

5. **Click OK.**

   Figure 11-9 shows the correct settings for this exercise.
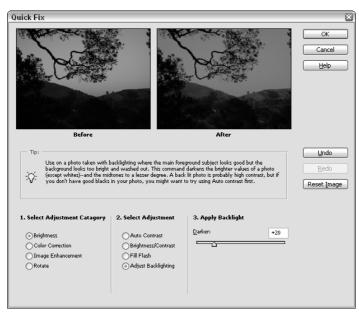
Figure 11-9: The Quick Fixes dialog box, showing the Backlighting settings

Converting to grayscale

Converting an image to grayscale can be done in many ways, but the two most popular use the Image ➪ Mode ➪ Grayscale command or (in Photoshop Pro only) the Image ➪ Desaturate command. If you use the Image ➪ Mode ➪ Grayscale approach and you want to continue to work in color (as you would if you wanted to "hand color" certain areas of the image), then you have to immediately issue the Image ➪ Mode ➪ RGB command to put the (now) grayscale image back into color mode.

One advantage of professional-level Photoshop 7 (and earlier) programs is that you can remove all the color without switching modes, just Choose Image ➪ Adjust ➪ Desaturate. Instantly, the color's gone, but you're still in the original color mode. I can't show you the result of hand-coloring in this section of the book because it's black and white, but you can open the file `Deborah Shaded` on the CD to see a very nice example of the technique.

Note   If you're going to have your photo published in black and white, you may want to use the techniques given here to preview it in grayscale. If you do so by using the Desaturate command, you can immediately return it to color by using the Undo command. Photoshop Elements users have to use the History palette to restore the image to its original state.

Converting to black and white

When I say "black and white," I am not talking continuous tones from black to white. Technically, that's what grayscale (the topic of the previous section) is all about. Turning an image into pure black and white can create a great deal of drama. It's also very effective for making images that can be easily printed on any copy machine or low-cost one-color printer. Figure 11-10 shows an image that has been converted to black and white from a full range of tones.
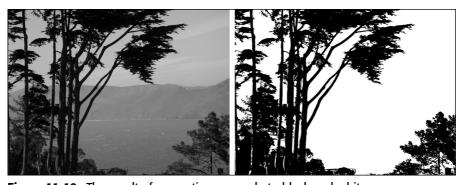
Figure 11-10: The result of converting grayscale to black and white

The trick to making a good black and white picture is in finding the right dividing line between what gets interpreted as pure black and what gets interpreted as pure white. In any Photoshop program, you can do so easily by using the Threshold command:

1. **Open the file** Tree and Sea **from the book's CD-ROM.**

2. **Choose Image ➪ Adjustments ➪ Threshold.**

   The Threshold dialog box appears, as shown in Figure 11-11.
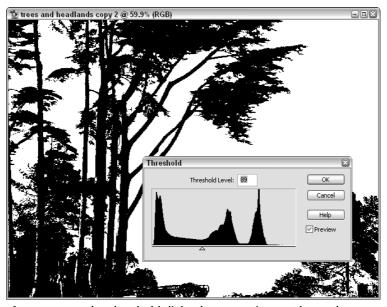
Figure 11-11: The Threshold dialog box, superimposed over the image that you are converting to black and white

3. **Drag the threshold slider from side to side to see what effect various thresholds have.**

4. **When you find the compromise that is best for your purposes, click OK.**

Tip

Showing detail in some portions of the image is easy if you duplicate the image layer and then use the steps just given when you want to adjust different thresholds for each layer. Then erase those portions of the top layer that you don't want to keep in the photograph. You can erase large areas of the layer by selecting them with one of the marquee tools and then pressing the Delete key. (It's more practical to erase smaller areas by choosing the Eraser tool.)

Turning an Image into a Poster

You can easily simplify an image into fewer colors to get something that looks more like a Toulouse Lautrec Moulin Rouge poster than a photograph. This is a very easy way to make illustrations for Web pages that can be optimized to very small files because they contain only a limited number of colors. You can choose to use as many as 256 colors in a posterized image, which is one way to produce a 256 color GIF image that can look very photographic — specially if the image is going to be shown at a very small size. I personally like the results (not to mention the performance) that you get when you reduce the image to very few colors (e.g. between three and sixteen). The image in Figure 11-12 shows the original photograph and the way it looks in 8 colors. You can see that posterized images can also be very effective in grayscale.

Figure 11-12: A full-range photo and a posterized version of the same image

Tip

If you use a professional version of Photoshop and you want to create an image that you can print in a limited number of custom colors (such as Pantone colors), just posterize the image to the number of colors you want to use. Then you can use the Magic Wand tool (make sure Contiguous is unchecked in the Options Bar) to select each color individually and then fill with that color by opening the Color Picker and clicking the Custom Color button. You can then choose the color book you want to pick the color from, and pick the custom color. It appears as your foreground color. Then you just fill the selection with the color you've picked. Repeat the process for each posterized color.

Making a posterized image is easy:

1. **Open the file** West Marin Hills **from the CD-ROM.**

2. **Choose Image ➪ Adjustments ➪ Posterize.**

   The Posterize dialog box appears, as shown in Figure 11-13.

Figure 11-13: The Posterize dialog box with the correct settings for this exercise

3. **Select Preview.**

   You can instantly see the effect of the number of colors you enter directly on the image.

4. **In the Levels field, enter the number of colors you want to use in the image.**

   You can experiment with this as much as you like to get the degree of image abstraction you're looking for.

5. **When you're satisfied, click OK.**

Tip Of course, you won't be able to control the shapes in the image if you *must* use a specified number of colors. In that case, duplicate the image several times and use the Brightness/Contrast controls to set the image to different levels of contrast. Then you can posterize each image and pick the one in which you like the shapes the most.

Creating Instant Effects

Photoshop Elements doesn't let you automate the execution of a sequence of commands, but you can use macros that have been created for you to execute a number of very useful routines. These automated routines are called Effects and can be accessed by choosing them from the Effects palette. By default, the Effects palette appears in the Palette Well (the long gray bar at the upper-right side of the Elements Task bar). Effects are unique to Photoshop Elements, although you could create them by using Actions in any professional version of Photoshop since 5.5.

The lovely thing about Effects is that you choose them from a palette of thumbnails. Each thumbnail illustrates what the effect does. To make the Effect happen on the currently active layer, just drag its thumbnail onto the image. Alternatively, you can click a thumbnail to select it and then click the Apply button or double-click the desired thumbnail.

After you open the Effects palette, you can choose to look at Effects by category or you can see them displayed all at the same time. Categories are Frames, Textures, Text Effects, and Image Effects. You can choose any of these categories from the Effects palettes Categories menu, or choose All to see them all at once.

At first it may seem that these effects simply overlap with filters. That's almost true, but achieving the same result as using an Effects would require the use of multiple user settings in each of several filter dialog boxes — each applied in the same order as in the Effect.

As is the case with most Photoshop commands, Effects are applied to the currently selected layer. If you want them to apply to the entire image, first duplicate (choose Image ⇨ Duplicate) and flatten (choose Layer ⇨ Flatten Image) the layers in the duplicated image. Of course, if the only layer in the image is the Background layer, then no worries.

Each Effects category is illustrated in Figures 11-14 through 11-17:

Figure 11-14: A Frame Effect called Wood Frame
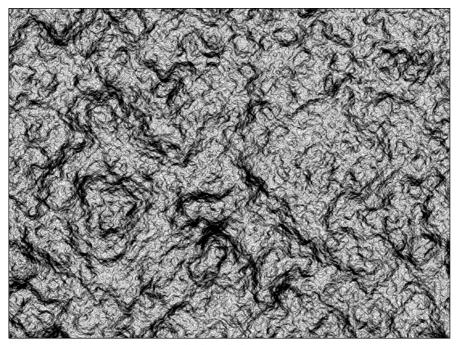
Figure 11-15: A Texture Effect called Asphalt

Figure 11-16: A Text Effect called Brushed Metal

Figure 11-17: An Image Effect called Brushed Metal

Tweaking Image Characteristics

This section deals with methods for controlling the basic image characteristics using techniques that give you a finer degree of control over a given aspect of the image's final appearance. All the same, these are techniques that are still easy enough for anyone to tackle.

Sizing, cropping, and rotating

You may want more control over sizing, cropping, and rotating images than the Quick Fixes in Photoshop Elements provide for several reasons:

✦ **Save memory:** Disk space is precious and image files tend to be dispropor-tionately large compared to other types of data (except analog sound and video). Therefore, you want to throw out data you definitely know you're not going to use.

✦ **Increase resolution:** You may need to output to a size that requires more resolution than your camera or scanner can produce.

✦ **Improve composition:** There may be more stuff in the picture than you want your viewers to see because its presence spoils the composition or detracts from the subject.

✦ **Optimize for the Web:** You want to minimize the image size and the complexity of its data for optimal Web performance.

✦ **Correct distortion:** You need to correct the perspective distortion that occurs when you have to shoot an object that is at an angle and has parallel sides, such as large building, in order to fit the whole object within the frame.

These problems are so common that if you fix them first, you'll generally have an easier time with the later steps.

Using the Marquee tool

Using the Rectangular Marquee tool is the most accurate way to crop if you need to crop portions of an image that are close to the border. The Cropping tool automatically snaps to the edge of the frame if it's within a few pixels of that edge. Also, you can set the Marquee to an exact size, which ensures that the image is exactly the right size or proportion (which is especially useful when you want to crop a whole series of images to the same size). Follow these steps to use the Marquee tool to crop the image to a particular proportion:

1. **Open the file** `Modern Metal Tabletop` **from the CD-ROM in Photoshop or Photoshop Elements.**

   This shot, as is typical of many digital cameras, has the proportions of a 35mm film frame. Suppose you want the image to fit an 8 x 10-inch frame. To accomplish this, you want the crop to fit a 1:1.25 proportion. (You can get the proportion for any image by dividing the value for the short side of the target frame into that of the long side of the target frame.) In this instance, the picture has a "landscape" orientation (wider than tall), so we want the exact height.

2. **In the Rectangular Marquee's Options Bar, choose Fixed Aspect Ration from the Style menu.**

3. **In the Options Bar, enter** 1.25 **in the Width field and** 1 **in the Height field.**

   The Info palette is shown in Figure 11-18.
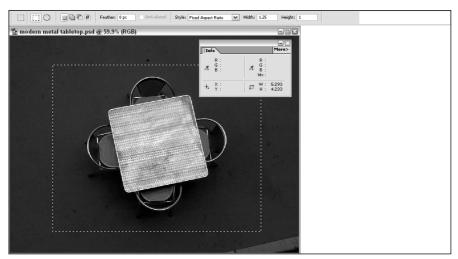
Figure 11-18: The Info palette can always be used to report the size of any rectangular selection. It's a good idea to keep your unit preferences set to pixels.

4. **Click in the image.**

   The marquee instantly delineates the precisely proportioned cropping frame — no matter what overall size you drag it to. Make sure that the marquee's dotted line is showing on all four sides. Otherwise, your cropped image won't have the correct proportions.

5. **Choose Image ⇨ Crop.**

6. **Choose File ⇨ Save As.**

   Save the cropped image with a new name. (You should never obliterate the original by writing over it.) In the Save As dialog box, choose a file format that is not lossy (PSD if you want to preserve the layers, TIF for the widest range of compatibility with other programs). Be sure to add the name of your file format's extension to the end of the file so it can be read across platforms.

Because you have cropped the image (and especially because you have cropped it proportionately), you may want to resize later.

Using the Cropping tool

The Cropping tool is the best mechanism for quickly trimming when exact finished proportions are not a problem. For instance, suppose you need a picture to give to your significant other and you only have one, with your arms around your old flame. You just grab the Cropping tool from the toolbox and drag diagonally across the part of the picture you want to keep. You can fine-tune the exact area to be trimmed by dragging any bounding-box handle. You can also drag the handles in such a way as to rotate the cropping marquee or stretch its side to correct for perspective distortion. When everything is adjusted just the way you like it, double-click inside the

bounding box. Photoshop instantly trims all layers of the picture. If the marquee was rotated, the image is automatically rotated. If the frame was stretched to correct distortion, Photoshop automatically re-draws the image with straightened edges that fit neatly within the original frame.

To interactively trim the image to new proportions:

1. **Open the file** `Angel Island` **from the CD-ROM.**

2. **Choose the Crop tool from the Toolbox.**

   The Crop tool Options Bar appears. If you like, you can enter an exact size for the Crop tool, but skip that for now and just crop interactively for the most pleasing aesthetic effect.

3. **Drag from the approximate location of the upper-left corner to the approximate location of the lower-left corner.**

   You can fine-tune the exact shape of the time *after* you've placed the marquee, as shown in Figure 11-19. Notice that after you have placed the marquee, the Options Bar's options change.

Figure 11-19: Cropping with rotation

The horizon line in the original picture isn't horizontal, so you want to rotate the image slightly. This is a better time to rotate because the image is straight within the frame; you don't have to crop in a separate step (as you would if you rotated with the Free Transform command).

4. **To rotate the image, just place the cursor outside any corner of the cropping marquee.**

   The cursor changes to a curved arrow to notify you that dragging will rotate the marquee. Stop rotating the image when the horizon line is straight.

5. **Drag the center handles so the framing is as you like it.**

    Make sure that all edges are inside the boundaries of the original image.

6. **When you're happy with the way the picture is framed, press Return/Enter or click the Checkmark in the Options Bar.**

Follow these steps, which only apply to Photoshop 7, to crop and correct perspective at the same time:

1. **Open the file** `Yellow Bay Window` **from the book's CD-ROM.**

2. **Choose the Marquee tool.**

    The Marquee tool's Options Bar appears.

3. **In the Options Bar, check the Perspective box.**

4. **One corner at a time, drag the corner so the vertical and horizontal lines in the building are parallel to the edges of the marquee, as shown in Figure 11-20.**
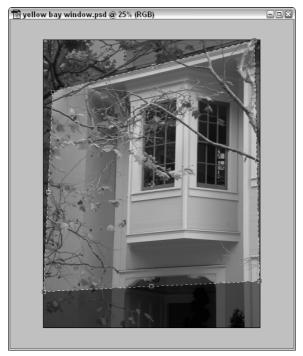
Figure 11-20: Arranging the corners of the marquee to correct perspective

5. When you're satisfied with the way the marquee looks, click the Commit button (big checkmark) in the Options Bar.

The image is transformed to look like the one in Figure 11-21.

Figure 11-21: The bay window, cropped to simultaneously correct perspective

Resizing

In order to make an image a different size than the original without cropping, you have to add or subtract pixels. After all, resolution is nothing more than pixels-per-inch. If the picture is to be made larger, the pixels would appear to be larger because you'd simply do the required multiplication of pixels. You can force Photoshop to do it that way, but it leads to those chunky-looking images that used to be typical of digital imagery. Today's programs use much more sophisticated techniques for something called *resampling*, in which the program tries to shade the duplicated pixels so their color and intensity fall in-between those of their neighbors instead of simply multiplying or subtracting pixels. Usually, the result is a smooth-shaded image with soft edges. In Figure 11-22, you see a segment of an image at its original size and two versions that have been magnified by 400 percent. Notice that in the middle image, there is a pronounced "square pixel" effect that results from simply reproducing each pixel sixteen times. This is called *nearest neighbor resampling* because each additional pixel is a copy of its nearest neighbor.

The image at the far right has been resampled using *bicubic interpolation* so the new pixels form a subtle gradient between pixels that were formerly neighbors.
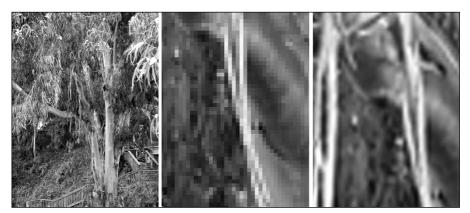
Figure 11-22: The image on the far right appears to have much higher resolution than the one in the middle. However, the middle image doesn't actually contain more detail, so the edges look fuzzy.

Of course, you notice that the hard-edged lines still show some stairstepping, even though it's less pronounced than in the middle image. That's because the pixels that form the edges (lines) and those that form the background contrast so abruptly that the program can't put enough pixels in between to form a smooth transition.

The other drawback is that the picture is softer; it appears to be slightly out of focus because the pixels that form the edges are blended. You can fix this problem with an Unsharp Mask filter, but doing so makes the edges a bit more jagged.

Using the Levels command

If you're still using Photoshop Elements 1.0, you can use the Levels command just as you would in any professional version of Photoshop. The latest version of Photoshop Elements omits the Levels command; the idea was to make it easier for beginners to use.

The Levels command presents you with a chart that shows how many of the image's pixels are at a given level of brightness along a horizontal line. This chart, called a *histogram,* is shown in Figure 11-23.

The Levels controls, accessed through the Levels dialog box, represent the quickest and most efficient way to ensure that your image contains a full range of tones while the midtone values are as bright as you want them to be—unlike the image in Figure 11-24.
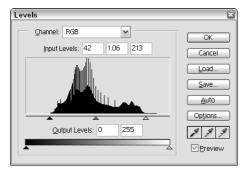
Figure 11-23: The Input Levels histogram (the shape that looks like the silhouette of a mountain range) shows the number of pixels assigned to each level of brightness.

Figure 11-24: A photographer would describe this image as flat or muddy.

To give this picture a full range of tones that would be the envy of Ansel Adams, follow these steps:

1. **Open the file** `Yellow Bike` **from the CD-ROM in Photoshop.**

2. **Zoom in to at least 100 percent so you can easily judge the brightness of very small areas.**

3. **Choose the Eyedropper tool.**

4. **Choose Window ➪ (Show) Info.**

   The Info dialog box appears.

5. **Drag the eyedropper over what appears to you to be the brightest pixels in the image.**

   Watch the RGB values change in the Info dialog box. When the eyedropper shows the highest number, you have found the lightest spot in the image. Make a mental note of exactly where that spot is.

   Note Sometimes you may want the lightest and darkest spots in the final image to be different from those that are *actually* lightest and darkest. That is a perfectly legitimate subjective and artistic choice.

6. **Choose Image ➪ Adjust ➪ Levels. (Choose Image ➪ Enhance ➪ Brightness/Contrast ➪ Levels in Photoshop Elements 1.0.)**

   The Levels dialog box appears. Ensure that the Preview box is checked.

7. **Choose the White eyedropper, and click the lightest spot in the image (or the spot that you want to be the lightest).**

   The image instantly brightens (as shown in Figure 11-25).

8. **Choose the Black eyedropper, and click the darkest spot in the picture.**

   When you click, the entire image darkens, and you see a full range of tones from black to white. If you're satisfied with the result at this point, your work is done. Most of the time, however, you can improve the image considerably by changing the gamma. (You want gamma? Boost the gamma.)

In the example shown in Figure 11-26, I wanted to raise the gamma (brighten the value of the pixels that are currently 50 percent gray). When I do so, Photoshop raises the other tonal values in a smooth curve from the brightest point to the darkest point (as do most other professional image processors).
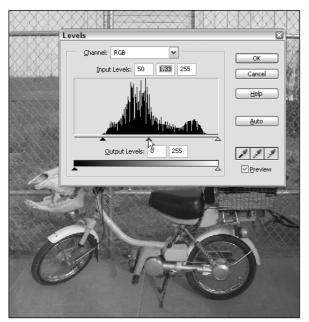
Figure11-25: Clicking the brightest highlight on the white fender with the White eyedropper makes this the white point in the image. Any pixels that were actually brighter will now be white as well.
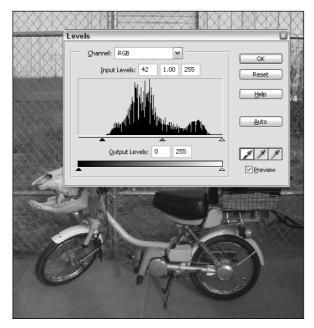
Figure 11-26: I wanted to make the midtones brighter, so I moved the midtone pointer to the left until the preview showed me the result I liked.

You probably don't want to use the Gray (middle) eyedropper. It changes the color balance so you get a neutral 50 percent gray as that color and all the other colors in the image are adjusted accordingly. This evenly affects the overall color balance of the image. This is fine if you're shooting a series of photos for an illustration. Just place your Kodak gray card in the scene, shoot a frame, and then take it out. You can then digitize this frame, set the values for the image as described earlier, and then click the Gray eyedropper on the Kodak Gray card. Bingo! You've achieved perfectly accurate color (white) balance. You can now change the midtone value by dragging the gray slider — without affecting color balance.

Using the Variations option

Photoshop 7 and even Photoshop Elements 2.0 offer several ways to get rid of unwanted color casts — that is, to establish proper (or at least, desirable) overall color balance. The trouble is, it's often difficult to judge what really looks best unless you have something to compare it to. Some photographers even make several prints using different color balance techniques, scribble notes on the prints as to which technique to use, and then make the final print based on what looked best in the test under room light. In fact, that's still one of the best ways to do it. In fact, I know some extremely picky photographers who wouldn't do it any other way.

The Photoshop family of image editors offer a similar method that much easier because it's more or less automatic. Operations are identical in Photoshop pro products and Photoshop Elements 1.0, but they've been even further simplified in Photoshop Elements 2.0. Remember, however, that the guiding principles are the same in all the post-Photoshop 5.0 products: You look at a contact sheet that shows the image interpreted by different color variations. To correct your image, you click on the one that looks best to you in comparison to all others. The color balance of your image then changes to match your choice. If you then want to tweak your choice, you can look for another thumbnail that looks even better than the one you just picked. Click the thumbnail that represents an improvement and it further modifies the image. You just keep going until you're happy — then click OK.

The only difference between the way Variations work in Photoshop Elements 2.0, as compared to other versions of Photoshop that use Variations, is that Photoshop Elements 2.0 presents you with few thumbnails and settings to choose from. This makes it easier to make up your mind about which effect you select. Figures 11-27 and 11-28 show you the Variations dialog boxes for Photoshop 7 and Photoshop Elements 2.0.
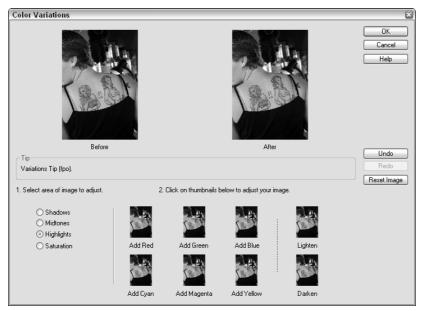
Figure 11-27: The Photoshop Elements 2.0 Color Variations dialog box

Follow these steps to improve color balance by using Variations in Photoshop Elements 2.0:

1. **Open the file** `Bar Tattoos` **from the book's CD-ROM.**

2. **Choose Enhance ⇨ Color Variations (For Photoshop 7 and earlier, the command is Image ⇨ Adjust ⇨ Variations).**

   The Variations dialog box appears, as shown in Figure 11-27 and Figure 11-28.

3. **Click to turn on the Midtones button.**

   Making corrections to the mid-tones generally does the job. The exception is generally when nearby surroundings or deliberately-colored lights (such as a neon sign) cast a shade that is visible mostly or only in highlights or shadows.

4. **Experiment with clicking the thumbnails.**
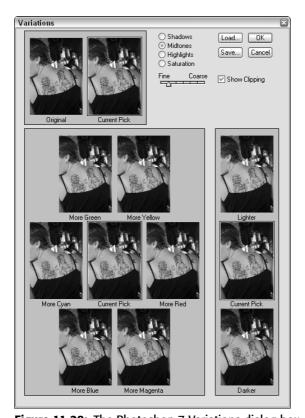
Figure 11-28: The Photoshop 7 Variations dialog box

As you can see, this picture has a bit too much green and a bit too much yellow. You can click any or all of the thumbnails to see what they do to the preview, then click Undo to restore them to the previous state. You can even do a lot of experimentation and then click the Reset Image button to revert to the original image and start all over again if you want.

5. To correct this image, click the Add Green thumbnail.

As you can see in the preview, this looks much better. However, you'll notice that all the thumbnails change to reflect the first change, and now the Add Yellow button looks a little better than the After image now looks.

6. Click the Yellow button, and its effect is added to the After image.

You could keep going, but for now, that's enough. If the exposure were a little off or you wanted to add or subtract either brightness or color intensity by clicking the appropriate radio buttons and then clicking your choice of thumbnails.

7. When you are totally satisfied with the result, click OK.

Note   The Photoshop 7 version of this procedure also lets you set the intensity of the change. At the top of the dialog box, you see a bar divided into six parts. If you drag the slider to the right, the effect increases. Drag the slider to the left and the effect decreases.

Adding a color tint

Sometimes you just want to change the overall shade of the photo for pure effect. You could use your image editor's Color Balance command (Photoshop 7 Image ➪ Adjust ➪ Color Balance). However, when what you're after is an effect, Photoshop Professional's Image ➪ Adjust ➪ Hue/Saturation is a very quick, efficient and interactive tool. You can just click the Preview checkbox to see the results of your changes and drag the Hue slider from side to side until you like what you see. The Hue/Saturation dialog box is shown in Figure 11-29.
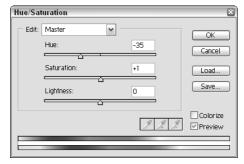
Figure 11-29: The Photoshop 7 Hue/
Saturation dialog box

Tip   If you click the Colorize checkbox, the whole image becomes toned in the shade you drag the slider to. Try duplicating the layer (drag it to the New Layer icon at the bottom of the Layers palette), and then use the Hue/Saturation dialog box to create a monochromatic layer of the image on the top layer. Now experiment with changing the opacity of the top layer — and also with changing Blend mode on the top layer. (You choose these from the Modes menu in the Layers palette menu.)

Another easy way to tint an image, which works equally well in any Photoshop product, is to create a new top layer, and then fill it with exactly the color you want to tint with. Then all you have to do is choose Color from the Layer palette's Blend Mode menu. If you don't want the tint to be a solid color, drag the solid-color layer's Opacity slider to the left until you see the effect you want.

Using the Burn tool

Sometimes the only picture you've taken of a subject has highlights that appear to be totally blocked to white. If there's even the smallest amount of detail in the base image, here's a trick to let you add some detail to those starkly white areas:

1. **Open the file** `Clouds` **from the CD-ROM.**

   Notice that some sunlit portions of the clouds have no detail at all.

2. **From the Toolbox, choose the Burn tool.**

3. **From the Burn tool's Options Bar, choose a large, soft brush.**

4. **In the Burn tool's Options Bar, choose Highlights from the Range menu, as shown in Figure 11-30.**

5. **In the Exposure field, enter a fairly small number.**

   I suggest around 15%.

Figure 11-30: The Burn tool's Options Bar, showing the settings used in this exercise

6. **Gradually click or drag in the highlight areas.**

   Detail slowly begins to appear, as shown at the right in Figure 11-31.

Figure 11-31: Notice the detail in the highlighted area of the clouds in the photo on the right.

Using the Screen mode

When you need a low-contrast, bright image to use as a background under type (very cool on Web pages), here's a simple way to get it:

1. **Open the file** `Donna Profile` **from the CD-ROM.**

2. **If you want the image to be really light, choose Enhance ⇨ Brightness/Contrast ⇨ Brightness/Contrast.**

   The Brightness/Contrast dialog box appears.

3. **Drag the Brightness slider to brighten the image, and then drag the Contrast slider to a lower level to lower the overall contrast.**

   Photographers call this "flattening" the image.

4. **Choose Window ⇨ Show Layers (unless the Layers palette is already in view).**

5. **In the Layers palette, drag the Background layer to the New Layer icon to duplicate the Background layer.**

   The duplicated layer should be active. If not, click it to highlight it.

6. **From the Layer palette's Blend Mode menu, choose Screen.**

   The whole image instantly lightens up.

Although the whole image has become brighter, none of the tones in the image are much darker than 50% gray. That's perfect for use as a high-key background image. If your objective is to create a high-key photo as a technique for exhibit or publication, then you'll want something close to real blacks in the deepest shadows. Follow these steps to bring the blacks back in:

1. **Choose Layer ⇨ New Adjustment Layer ⇨ Levels.**

   The Levels dialog box appears, as shown in Figure 11-32. Your adjustments affect both underlying layers. If you had more underlying layers, it would affect them as well.
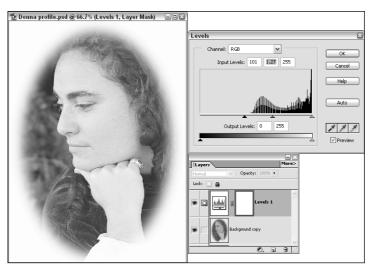
Figure 11-32: The Layers palette and the Levels dialog box, showing the settings used in this exercise

2. **In the Levels dialog box, drag the shadow (left) slider closer to where the histogram starts rising from the "floor."**

    You may also want to brighten the midtones for an even more "high-key" look to the skin tones.

3. **When you're satisfied, click OK.**

Reducing noise

Most of the operations in the previous sections have the potential for making the image somewhat grainier or mottled. In digital photography, both of these effects are called *noise.* Noise is hard to eliminate without using a third-party program such as Grain Surgery, which is discussed in Chapter 16. However, one cool trick in Photoshop Elements can be used to reduce noise. (It works in Photoshop 7 and other professional versions of the program as well.)

The irony is that this trick works more often than any other I've found for removing noise. Use any noisy image you have in your library for the following exercise:

1. **Ensure that you have the Layers palette handy.**

    If it's in the Palette Well, drag it out into the open. If it's not visible at all, choose Window ⇨ Layers. The Layers palette appears.

2. **Choose the Zoom tool.**

    Zoom close enough to easily see the noise.

3. **Duplicate the layer and make sure the duplicated layer is active.**

4. **Choose Filter ⇨ Blur ⇨ Gaussian Blur, and drag the slider to about 2 or 3 pixels.**

   This technique blurs the duplicated (top) layer just enough to blend the color of adjacent pixels.

5. **From the Blend Mode menu in the Layers palette, choose Color.**

   All the color blotchiness in the noise disappears.

> **Note** This technique won't fix scattered grain. However, if you have only a few areas where it is so obvious that it's objectionable, you could brush out the grain with the Blur brush, which looks like a drop of water in the Toolbox.

Retouching

Nearly every photograph can be improved with a little retouching. This may be limited to removing dust and scratches from a scanned image or be as complete a transformation as converting your image to sepia tones.

Using the Clone tool

The tool that all versions of Photoshop use most frequently for retouching has been with it since the beginning. This tool is called the Clone tool and is used to copy any area the size of the brush from one part of the picture to another. So you can paint an area of clear skin over a scar or get rid of the graffiti on a building by painting over it with an unmarred portion of the same surface. You can even replace windows with walls or dividing line stripes on a road with clean asphalt. Probably the two things the Clone tool is used for the most are getting rid of the garbage on a lawn or the pimples on a young girl's skin.

Follow these steps to get acquainted with the clone tool:

1. **Open the** `Angel Island 2` **file from the book's CD-ROM.**

   Unfortunately, a parking lot and a sign spoil the otherwise tranquil beauty of this foggy scene.

2. **Double-click the Zoom tool to view the image at 100% magnification (that is, every pixel is shown at its actual size).**

   It is usually best to work at this magnification when cloning (or using most any other retouching technique) so you can instantly spot any "seams" or mismatches between the original image and the retouched area.

3. Press the Spacebar and drag around the image until the part you want to retouch is centered in the workspace window.

Start with the parking lot in the lower-left corner.

4. Choose the Clone Stamp tool from the Toolbox, as shown in Figure 11-33.
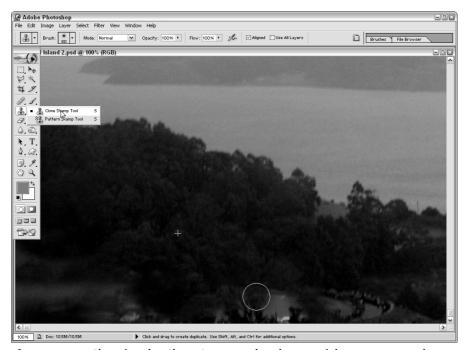
Figure 11-33: Choosing the Clone Stamp tool. At bottom right, you can see the cross marking the pickup point and the circle representing the cursor size.

5. In the Clone Stamp tool's Options Bar, select Aligned.

Set the Mode to Normal, Opacity to100%, and Flow to 100%.

6. Place the cursor on the area you want to clone *from*.

In this case, choose the trees above the parking lot.

7. Press Opt/Alt, and click to establish this as the pick up point.

8. Place the cursor over a portion of the parking lot and start painting.

Fill in as much area with the texture of the tree tops as you can without starting to paint in other areas of the picture.

9. **Press Opt/Alt + click to reposition the pickup point in relation to the position of the cursor as necessary to keep the treetop texture reasonably even.**

   When you've finished replacing the parking lot, you'll want to replace the small white sign on the right side of the image.

10. **Press the Spacebar so the cursor changes to a Hand and drag to reposition the image so you can see the sign.**

11. **Right-click (or control-click if you only have a one-button Mac mouse) to see the contextual menu for Brushes.**

12. **Scroll through the menu to find the brush size you want, and then click its stroke image to choose it.**

    You should pick a brush size that is feathered (fades away at the edges) and just large enough to cover the defect (in this case, the sign).

13. **Position the cursor over an area of the image that you want to replace the sign with, and press Opt/Alt + Click to set your anchor point.**

14. **Place the cursor over the sign and click (or click and drag if necessary) to cover the sign.**

    The final result is shown in Figure 11-34.

Figure 11-34: The retouched Angel Island photo

Using the Healing brush

The latest version of Photoshop, Photoshop 7, incorporates a new tool called the Healing brush, and it rids your photos of small defects one zit at a time as you stroke. It should be called the Miracle Brush. The miracle comes when you realize that the Healing strokes match both the color and texture of the part of the image that you're covering.

You can use the Healing brush to fix just about any kind of small defect in any kind of a photo. However, it's going to become indispensable to anyone who does fashion, glamour, or portrait photography because it kills pimples, scars, and wrinkles dead.

Follow these steps to use the Healing brush:

1. **Open the file** `Florencia Smile` **from the CD-ROM.**

   There's not much you'd really want to fix in this lovely face, but you'll quickly get the idea of what could be done to a much worse case.

2. **From the Toolbox, choose the Healing brush.**

   The icon for the Healing brush looks like a Band-Aid.

3. **Place the cursor over the skin texture you want to use, press Opt/Alt and click.**

   You need to tell the program which part of her skin most closely matches the texture of the skin you're retouching by setting a target point (much like the pickup point used with the Clone tool).

4. **Size the brush just a bit larger than the blemish you want to remove.**

5. **Place the brush over the blemish and click.**

   At first, the stroke may seem all wrong. The texture is blurred and the color doesn't match. But wait! In a second (or a few, if you've done much painting or are using a large brush) the original stroke fades to a point where the texture and color match.

Note   There is an exception to this ease-of-use. If you retouch a light area that's very close to a dark area (or vice versa), the colors may not match. If that happens, first try using a smaller brush and work on the area a bit at a time. If that doesn't work, drag a freehand selection marquee with the Lasso tool so you "fence off" the area you're retouching.

You can see the final result of working with the healing brush by looking at the "before and after" close-ups shown in Figure 11-35.

Figure 11-35: At left is the small skin irregularity that needs to be fixed, at the right is the result.

Getting rid of dust and scratches

You can use the same techniques detailed earlier to remove dust and scratches. However, there are sometimes zillions of tiny dust particles and millions of tiny scratches. This is particularly true of photos that you're trying to "rescue" from mistreatment or age. You're also likely to get dust and scratches when you take your photos to your local low-end copy shop for scanning (or when you forget to clean your scanner before putting it to work).

In those instances, use Photoshop's Dust & Scratches filter. However, use it carefully. If you overdo it, you'll blur the picture to an unacceptable degree. You'll get the best results if you use the Dust & Scratches filter just enough to get rid of the bulk of the defects, then use the Healing Brush on the larger ones that remain.

This technique works equally well in either Photoshop Pro or Elements. Here's how to use the Dust & Scratches filter:

1. **Open the file** `Dusty` **from the CD-ROM.**

   This is an image on which I purposely created "dust & scratches" that were 1 pixel wide. I then added some slightly larger scratches.

2. **To get rid of the majority of the junk without blurring the image too much, choose Filter ➪ Noise ➪ Dust & Scratches.**

   The Dust & Scratches dialog box appears, as shown in Figure 11-36.

Figure 11-36: The Dust & Scratches dialog box set at a 2-pixel radius. Note that the picture in the preview window is a bit softer than the picture in the 100% view in the background, but there are very few spots and scratches.

3. **Make sure the Preview box is checked in the Dust & Scratches dialog box.**

4. **Enter a figure of 1 (pixel) in the Radius field.**

   If that doesn't eliminate most of the problem, enter a figure of 2. The higher the resolution of your image, the higher you can go, but be sure to stop as soon as overall sharpness becomes unacceptable.

   You can restore some edge sharpness by raising the threshold. I was able to get acceptable results with this particular image at a radius setting of 4 and a Threshold setting of 27. Those are just guidelines. You'll have to experiment. Also, remember that overall resolution is very important.

5. **A few of the larger defects may be left over. If so, use the Healing Brush or (if you only have Photoshop Elements) the Clone Stamp to eliminate them.**

If you're using a professional version of Photoshop that has a History Brush feature, try this: After you've run the Dust & Scratches filter, open the History palette (Window ➪ Show History). Select the Snapshot and then choose the History Brush from the Toolbox. You can now paint selected areas back to their original sharpness.

Tip

The Dust & Scratches filter can also be excellent for repairing an old photo after it's been scanned. Just be aware that you'll almost certainly need to use the Clone Stamp tool to eliminate the larger cracks. Sometimes large stains can be removed with the Burn and Dodge tools.

Creating sepia tone and hand-colored photos

Just because your digital camera takes color photos, there's no reason why you need to end up with full-color results. You can easily reduce the image to grayscale or black and white. You can then change the result so it is tinted in any tone you like and produce a photo that looks as though it were made using century-old techniques. Finally, you can paint any color over the original color in order to end up with a photo that looks hand-colored. Indeed, it has been hand-colored, but there were no transparent oil colors to buy. I can't show you the results of all these color changes in a black and white book, but I'll give you the names of the color files on the CD-ROM so you can display the color results on your computer.

I've already shown you how to convert image to black and white, grayscale, and toned versions at the beginning of this chapter. Here's how you create a toned image in Photoshop Elements and then hand-color it:

1. **Open the file** `Tia Eye Gray` **from the CD-ROM.**

   This is a grayscale photo, but should you need to change a photograph to grayscale in Photoshop Elements 2.0, follow these steps:

   1. **Choose Enhance ⇨ Quick Fix.**

   2. **In the Quick Fix dialog box, select the Color Correction and Hue Saturation radio buttons.**

      The Hue/Saturation dialog box appears.

   3. **Drag the Saturation slider to the extreme left.**

   4. **Click OK.**

   Now you need to tone the image, even though Photoshop Elements doesn't let you work with Channels.

2. **Choose Window ⇨ Layers to bring up the Layers palette.**

   If the Layers palette is already visible onscreen, clicking its tab brings it to the front.

3. **Click the New Layer icon at the bottom of the palette.**

   This creates a new, transparent layer above the background layer. Now you want to fill the new layer with a color that you want to tone the cat's face.

4. **Click the Foreground Color swatch at the bottom of the Toolbox.**

   The Color Picker appears, as shown in Figure 11-37. In the Color Picker you'll see a gradient color strip with slider arrows on either side.
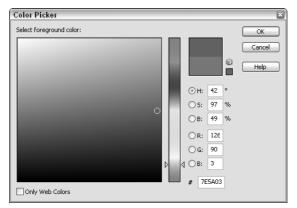
Figure 11-37: The Photoshop Color Picker dialog box

5. **Drag the sliders and watch the overall color of the Select foreground color window change.**

6. **When it's the shade you want to tone with, position your cursor over the exact color you want to use and click.**

   The Foreground Color swatch changes color. If that's not quite the shade you want, click a different position in the Select foreground color window until the color you see in the swatch is exactly the color you want, then click the OK button in the Color Picker.

7. **In the Layers palette, click the new layer's Name bar to make sure the new layer is active.**

8. **Choose Edit ⇨ Fill.**

   The Fill dialog box appears, as shown in Figure 11-38.
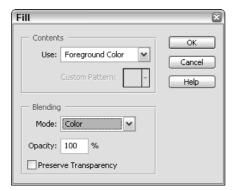
Figure 11-38: The Fill dialog box, showing the chosen settings

9. **From the Use menu, choose Foreground Color.**

10. **Leave all other settings at their defaults and click OK.**

    The entire image appears to be colored in your chosen color. Not to worry.

11. **From the Blend Mode menu in the Layers palette, choose Color.**

    Your photo is instantly tinted. If you want to change the intensity of the tinting, you can vary the opacity of the tint color's layer by dragging its opacity slider.

12. **To color the eye, choose Window ⇨ Color Swatches.**

    The Color Swatches palette appears.

13. **Click the color you want to paint with.**

    You could use the Color Picker, but Swatches makes it handier to switch to basic colors quickly.

14. **Choose the Paintbrush tool.**

15. **In the Paintbrush's Options Bar, choose the settings shown in Figure 11-39.**

Figure 11-39: The Paintbrush Options Bar, showing the settings required for coloring a monochrome image

16. **Place the brush inside the area of the eye you want to color and drag until it's colored.**

17. **Repeat steps 14 through 16 for each other area of the photograph you want to color.**

To compare the result of what you did with the result of what I described earlier, open the file `Tia-Eye Colored` from the CD-ROM.

Glamour techniques

The following techniques are especially suited to flattering human subjects, although they can certainly be useful in other situations. Add these to the other procedures I've shown you for removing blemishes, and you'll be able to open your own portrait studio where using a digital camera can save you lots of valuable time that quickly turns into more money in your pocket.

Sharpening and brightening eyes

The eyes are usually the most important item in a portrait. It almost always looks better to lighten the whites of the eyes and the iris of the eyes. You'll also get sharper-looking eyes if you darken the outer rim of the iris. Finally, select the eyeball and sharpen it slightly with the Unsharp Mask filter.

Here's the step-by-step if you need a little more hand-holding:

1. **Choose the Zoom tool and drag diagonally so you form a rectangular marquee that encompasses both eyes.**

   When you release the mouse button, you zoom in so both eyes fill the image area.

2. **Choose the Dodge tool from the Toolbox.**

3. **In the Dodge tool's Options Bar, change Opacity to about 15%, and drag inside the whites of the eyes and around the iris until both are about 25% brighter.**

   If you overdo it, the subject starts to look hypnotized and the retouching simply looks overdone.

4. **Choose the Burn tool from the same position in the Toolbox as the Dodge tool.**

5. **In the Burn tool's Options Bar, choose a small brush.**

   Three to five pixels is usually in the right range.

6. **Leave exposure at about 15%.**

7. **Carefully trace around the outer part of the iris to darken it.**

8. **Choose the Sharpen tool from the Toolbox.**

   The default setting in the Sharpen tool's Options Bar are usually just about right.

9. **Choose a small brush and carefully paint to sharpen the eyelashes, eyebrows, and the lighter parts of the eyes' irises.**

   The results of this process can be seen in Figure 11-40.

Figure 11-40: Before and after lightening and sharpening the eyes

Airbrushing

Photoshop Elements doesn't have a Healing brush, but here's a technique that you can use in any version of Photoshop that I've found very handy for quickly eliminating wrinkles, small skin blemishes, and softening bags under the eyes.

1. **Open the file** Kensportrait **from the CD-ROM.**

2. **Choose Window ⇨ Layers to bring forward the Layers palette.**

3. **Drag the Background Layer Name bar to the New Layer icon at the bottom of the palette.**

   The background layer is duplicated and become the topmost and active layer.

4. **In the top layer's Layer Name bar, click the eye icon.**

   The layer becomes temporarily invisible.

5. **Click the bottom layer's Name bar to activate the layer.**

6. **Choose Filter ⇨ Blur ⇨ Gaussian Blur.**

   The Gaussian Blur dialog box appears.

7. **Drag the slider until there is a noticeable softening of detail—just enough to obliterate the smallest wrinkles.**

8. **Double-click the Zoom tool to magnify the image to 100% so you can see the exact effect of the next strokes.**

9. **Click the top layer to activate it again.**

   The blurred image disappears from view.

10. **Choose the Eraser tool.**

    Choose a brush that's just a little larger than the defects you want to remove. The brush should be feathered at the edges so your strokes blend with the existing image.

11. **Erase any defects.**

    The color from the layer below comes through the erase to more-or-less match the color of the surrounding skin tone. This looks pretty good if you zoom out, but the fact is, there's probably some grain in the sharp version of the photograph that has been completely wiped out in the blurred layer. You want to make the grain of the blurred layer match the grain of the original layer as closely as possible.

12. **Make sure the bottom, blurred layer is selected, and be sure the image is magnified to 100% so you can see when the grain structure of both layers matches.**

13. **Choose Filter ⇨ Noise ⇨ Add Noise.**

    The Add Noise dialog box appears, as shown in Figure 11-41.

14. **Select the Gaussian radio button.**

Figure 11-41: The Add Noise dialog box

15. Move the Amount slider to the point where the grain matches the grain of the photo.

Sometimes, this is so delicate that I find it easier to type in small numbers and decimal points than to try to be accurate with the slider. Don't worry that the color doesn't quite match. We'll take care of that in the next step.

16. When you're satisfied with the grain match, click OK.

There's usually one or two finishing touches because the blurred "airbrushing" is a bit darker than the original image. The darker the wrinkles or other defects, the darker the airbrushing. You can fix most of these differences in one step.

17. Choose Enhance ⇨ Brightness/Contrast ⇨ Brightness/Contrast.

The Brightness Contrast dialog box appears.

18. Drag the brightness slider until most of the "airbrushing" is the same skin tone as the original image, then click OK.

If you still have any differences in tonality, use the Burn and Dodge tools to fix them.

Adding lighting effects

You can often add drama or increase or diminish attention to a particular part of the photography. These changes are generally most effective if they appear to be the result of the lighting that existed at the time the photograph was taken. Photoshop and Photoshop Elements can impose some lighting effects through the use of the built-in plug-in effects filters or those of some third-party extra cost filters. However, some of the best effects are those you can create with the dodge, burn, and selection tools. They're also the easiest. I'm going to show you those effects on a portrait, because it's easy to see and appreciate the effect of the results. However, these techniques can be applied to most subject categories equally well.

Start by using the burn and dodge tools to add a more dimensionality to Deborah's face:

1. **Open the file** `Deborah Backlight` **from the CD-ROM.**

   Notice that the hairlight on camera left has spilled over onto the side of Deborah's nose, making it seem larger and more predominant than it really is. Besides, it's just the wrong shape for Deb's face.

2. **Choose the Burn tool.**

3. **In the Options Bar, lower the Exposure to about 10%.**

4. **Choose a highly-feathered brush that is just about as wide as the area you want to burn in.**

   If you're not using a pressure-sensitive pen, choose a size that's a bit smaller because you can't vary the size with pressure.

5. **Blend slowly and smoothly.**

6. **If you overdo it in a spot or two, choose the Dodge tool, make the brush roughly the same size as the Burn tool was, then carefully lighten up the darker spots, as shown in Figure 11-42.**

   If you can afford it, spend a hundred bucks on a Wacom Graphire pressure sensitive pad.
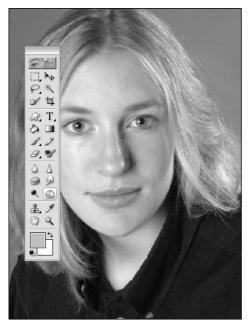
Figure 11-42: Adding directionality to the lighting with the Burn (and Dodge) tools

When you've finished shading (lighting) the nose, try lighting the background so the photo has a bit more depth.

7. Choose the Lasso tool and trace a shape outside Deborah's head and body.

When you reach the outside of the window, drag completely outside the window until you reach the point where you want to come back in, then close the selection. If you need to make more than one selection (as was the case here), press Shift before tracing the additional shapes with the Lasso tool.

8. Feather the selection by choosing Selection ➪ Feather.

The Feather dialog box appears, as shown in Figure 11-43. Enter a large feather radius, which causes the shadow we're going to cast to spread gradually on either side of the selection.

Figure 11-43: The Feather Selection dialog box, showing the settings used to feather the selection

9. **When you have the image looking just the way you want, save it to disk.**

   You can see a black and white version of the finished result in Figure 11-44. To see it in color, open the file Deborah Shaded from the CD-ROM.

Figure 11-44: The final result of "lighting" Deborah

Reshaping features

Both Photoshop 6 or 7 and Photoshop Elements have a filter that amounts to a whole add-in program that can do a million cool things by "melting" the image so you can push the pixels around any way you like. Learning to use all the features of this tool can take some time, but one feature you can use right away is its ability to inflate or deflate portions of the image. For instance, you can easily enlarge eyes (careful, or you'll create a caricature) or shrink a waist, which is what you do in the following exercise.

1. **Open the file** Back Gamin **from the CD-ROM.**

   This waist doesn't really need slimming, but slimming it dramatizes the picture.

2. **Choose Filter ⇨ Liquify.**

   The Liquify dialog box, which is really a program interface, appears, as shown in Figure 11-45.
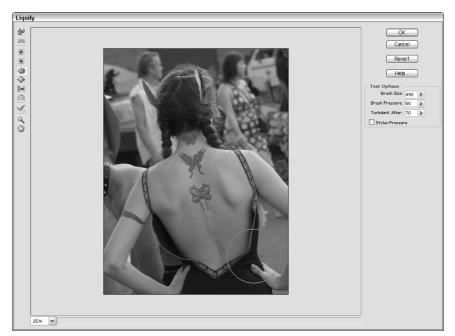
Figure 11-45: The Liquify dialog box while using the Pucker tool

3. Choose the Pucker tool.

4. Press the right bracket ( ]) key repeatedly until the brush outline is big enough to encompass the whole area you want to shrink.

5. Click and hold the mouse with the center of the circle just a little inside the waistline.

When you've put a nice little curve into that side of the waist, release the mouse button, move the brush to the other side of the waist and shrink it the same way.

6. Click OK.

That's all there is to it.

If you want to make things bigger, choose the Bloat tool. If you overdo anything in the Liquify command, there's also a Restore brush that gradually returns an area of the image to its original state if you stroke over it.

Making a Composite Image

Making an image out of a collection of images can be an art form in itself. If you want to see what is possible, take a look at the work of John Lund (`www.johnlund.com`), Gerald Bybee, and Robert Bowen. These are three masters of the art whose styles differ quite a bit from one another's.

There's a more practical (and usually less demanding) side to making composited images than creating entirely new realities, however. The most practical of these is replacing a boring, near-white sky in an otherwise lovely landscape or outdoor portrait. Or, you might want to fill a bare spot or an unsightly object by adding a new object to the picture.

There are two secrets to making virtually any composite believable: Lighting and Selection. The lighting on all the composited objects must have the same angle for the key light source, the same level of shadow fill and shadow edge sharpness, and the same color temperature. Second, the edge selection must be made with extreme care, so you have no visible seams between one composited object and another. It is also much easier to match pictures that were taken at the same resolution. If the photos were originally shot on film, it's easier to match colors if the same film stock and processing lab are used, but now I'm getting really picky.

If you can't really get resolution and grain to match, you may be able to "fake it" by using Photoshop's Add Noise filter to create the same grain structure for both images. You could do a more sophisticated version of the same idea by using Grain Surgery, a program that specializes in matching grain between images.

Having said all that, you'll get a better idea of how to composite images by starting with a fairly simple example in which you replace the background with another image. This example uses a close-up of a flower and another shot of an ivy-covered wall. Both the flower and the ivy were in front of the same side of the same building and were photographed at approximately the same time of day. Given those facts, you should get a pretty good match.

Open Photoshop or Photoshop Elements. The following instructions work in either program, but I used Photoshop Elements, so you may find a command or two on a different menu or in a different position in the toolbox.

1. **Open the files** `Marigold` **and** `Red Ivy` **from the CD-ROM.**

   Click the "marigolds" window to make it the active image.

2. **Make the Layers palette visible by clicking its tab in the Palette Well or by choosing Window ➪ Layers.**

3. **In the Layers palette, double click the Background layer's Name Bar.**

   The Layer Properties dialog box opens. Click OK. The layer's name is now Layer 0, and it's no longer a background layer.

4. **Choose the Background Eraser, which has an icon that shows scissors superimposed on the Eraser tool.**

   We want to keep all the vegetation in the foreground and to loose the black steel arch and the blue wall altogether. The marigold itself has sharp enough edges that we could separate it from the background with the Magic Lasso, invert the selection, press Delete/Backspace and everything but the Marigold would disappear — leaving a perfectly transparent background. However, we really want to keep all the foreground marigolds and some have semi-transparent borders because they are slightly out-of-focus. The solution lies in using the Background eraser.

5. **Look at the Background Eraser's Options Bar.**

   Notice that by clicking the right icon, you can switch between the background eraser, eraser, and magic eraser by clicking the appropriate icon at any time. For now, leave the Background Eraser selected and set the following options:

   • **Size = 18 px:** This is the pixel diameter of the brush. If you click the down arrow, you can drag a slider to indicate the size.

   • **Limits = Contiguous:** The limits set by the Size and Tolerance options apply as long as the cursor doesn't pass to an area that's outside those limits.

   • **Tolerance = 50%:** The Background Eraser considers an edge to be anything that's within 50% of being the same color as the foreground object.

   Notice that the cursor is a circle the size of the brush but has a cross in its center. The cross is so you can target the color to be removed. The circle represents the area within which the colors to consider erasing must fall. Figure 11-46 should help you to visualize this concept.

6. **Continue dragging the brush around the outside perimeter of the area you want to keep in the foreground.**

   If you come to an area where the brush doesn't erase enough, increase the percentage in the Options Bar. If it erases too much, press Cmd/Ctrl + Z to back up and then decrease either the brush size, the percentage of Tolerance, or both.

7. **When you've finished cutting out the background, choose the Lasso tool and drag a freehand marquee through the center of the erased area.**

8. **Press Cmd/Ctrl + Shift + I to invert the selection and then press Delete/Backspace to erase the contents of the selection.**

   The Marigolds and their attached vegetation how have a completely transparent background, as shown in Figure 11-47.

Figure 11-46: Notice that the color erased was the color that falls immediately under the cross and that no colors were erased that fell outside the circle that designates the brush size.

Tip
If you have some unnaturally dark or discolored edges, there are two fairly efficient ways to fix them: Either paint them the same color or erase them. To paint them the same color, use the airbrush and choose a small brush and choose Color from the Blend Mode menu. Then pick up the color you want to keep with the eyedropper and color the edge. Don't forget to change the foreground color whenever the colored area doesn't match its surroundings. To erase the "border", zoom in to about 300% and make your Background eraser brush very small and give it a fairly low (about 15% usually works) Tolerance. Then just pan around the image and erase the background, making sure to carefully place the brush's center point (the plus-sign or + in the center of the brush size circle).

9. **Press Cmd/Ctrl + A to Select All, the Cmd/Ctrl + C to Copy the selection to the clipboard.**

   This selects the entire image and pastes it into the background image as the foreground layer.

10. **Click the Red Ivy window to make sure it's active, and then press Cmd/ Ctrl + V to paste the Marigolds from the clipboard.**

    Because the two images were exactly the same size, the Marigolds should be perfectly placed over the new background, as shown in Figure 11-48.

Figure 11-47: The Marigolds on a transparent background

Figure 11-48: The composited marigolds and ivy

Controlling Image Sharpness

When working in an image editor, enhancing sharpness creates the illusion that you've captured a more detailed picture by creating more contrast between the pixels that form an object's edges, those that form the object's interior, and those that form its background. Figure 11-49 shows the difference between an image that is slightly fuzzy and the same image after it has been enhanced by the Photoshop Elements Quick Fix Autofocus tool.
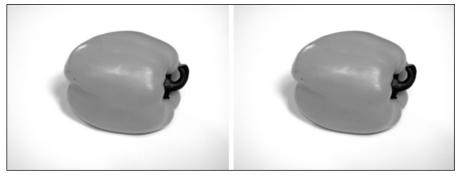
Figure 11-49: A slightly blurred image of a pepper and the same image after using Photoshop Elements' Quick Fix Autofocus

As you can see, although sharpness is improved, you can't expect really blurry images to suddenly become razor sharp. If you have an image editor that has an Unsharp Mask command, you'll have much better control. The real danger lies in not overdoing the sharpening effect because you'll get unnatural looking results such as stair-stepped edges, exaggerated graininess (image noise), and strange-looking edge haloes.

To sharpen using the Unsharp Mask tool in Photoshop professional versions, follow these steps:

1. **Open the file** `Fuzzy Pepper` **from the CD-ROM.**

2. **Choose Filter ⇨ Sharpen ⇨ Unsharp Mask.**

   The Unsharp Mask dialog box appears, as shown in Figure 11-50.
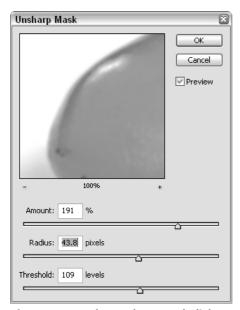
Figure 11-50: The Unsharp Mask dialog box showing the settings used to sharpen the pepper

Note Every picture's adjustments differ according to several factors — such as the overall image resolution, how much sharpening is required, and your reason for doing the sharpening. The settings shown in the figure are rather extreme, since what we're doing is attempting to fix an image that is an extreme case of what's fixable. The best overall advice is to start with the Amount slider and work your way down. For each slider, at the point where the image starts to get ugly, back off a bit and then try the next slider.

3. Adjust the sliders, and when you reach the Threshold slider check the image for artifacts and halos.

If you see any, try pulling each slider down just a little, starting at the bottom and working your way up.

4. Repeat the three steps above until you feel you've made the best compromise you can make, and then click OK.

Actually, the best use of the Unsharp Mask tool is cleaning up images that have been reduced or enlarged. They almost always loose a little of their "edge" after such an operation. If the enlargement/reduction is less than +/- 3x the originals, try setting the Amount at between 50% and 150%, the Radius at 1 or 2, and the Threshold at 0 or 1.

| Note | Try never to use a Sharpen command twice on the same image. It is always best to make it the last thing you do to the image before you finish the basic editing. You may want to use a more advanced tool, such as nik Sharpener Pro!, to do sharpening especially for the output device you use to make your final print. For more on this, see Chapter 18. |

Summary

In this chapter I covered the most basic and essential image-editing commands used by photographers. For the most part, I used Photoshop Elements as the model image editors because it has become extremely popular with digital photographers who want a professional level and Photoshop-compatible program without the more specialized tweaks that drive the price several times higher. In the next chapter, I delve into more specialized activities that may require Photoshop 7 to accomplish.

✦   ✦   ✦

Special Effects Solutions

This chapter covers some characteristics, tools, and filters that create special effects that are needed often enough to be termed life-saving—provided they are used to solve a real pictorial problem and not just for the heck of it. In other words, any effect, no matter how useful, can get overdone, silly, out-of-place, or just plain trite.

Most of the effects that I describe in this chapter are available in most general-purpose image editing software that's meant for people who are serious about their efforts in digital photography—even if they can't afford the full-on professional power of Photoshop 7. On the other hand, because Photoshop is the professional standard, is used more than any other program, and has an interface that's imitated by nearly everyone, the examples shown in this chapter are only guaranteed to work in Photoshop. All of the effects except the Extract command also work in Photoshop Elements. Additionally, all of the effects that are based on plug-ins that work in any of the image editors that are compatible with Photoshop 3rd-party plug-ins. At this writing, all of the effects work in Windows XP and some work in Mac OS X (all work in Classic mode).

The Liquify and Extract commands are found only in Adobe's Photoshop programs, and Extract is found only in the professional versions post version 6.0.

Extract and KnockOut

Perhaps the most widely useful special effect tool is one that can remove objects with complex edges from their backgrounds. *Complex edges* are those that are partially transparent (usually because they're glass), have way too many components to be practical to trace by hand (such as a girl's windblown hair), or are so shiny that the background is reflected in them.

You can sum all these problems up by describing the objects that have such problem edges as having *transitional edges,* which contain some of each of both foreground and background colors. In other words, there is no real defined edge — only a blend or transition that takes place in the overlapping space between one object and another.

Ultimatte KnockOut and the transition to Corel

Up until the Extract command in Photoshop 5.5, transitional edges had to be defined by extra-cost third-party programs such as Ultimatte KnockOut. Ultimatte KnockOut is now sold exclusively by Corel, Inc and called Corel KnockOut 2.Though at $349, it's still three times as expensive as some image editors, KnockOut is about one-third the price that it was. And now it's more versatile, much friendlier, and can be used as a plug-in. If you do composite photography for a living and your work has to be perfectly believable, KnockOut is one of the best tools you can buy.

KnockOut works on the same basic principle as Photoshop's Extract command: You designate an area that you want to keep in the foreground, and then designate an area you want to keep in the background. The area in between those two boundaries is the transitional area. Parts of that transitional area, such as hair, that have the same colors as pieces of the foreground are kept in the foreground. Parts of the transitional area that feature the background colors are dropped out to transparency, so you can easily keep a new background. Figure 12-1 shows a flying hair portrait with a very complex background. The area inside the smaller marquee is the foreground area, the area outside the larger marquee is considered background, and in between the two marquees is the transitional area.

It takes some practice drawing the inside and outside rings and using the syringe tool to pick out areas of small detail and color that must be kept in the transitional area, but with the practice comes a near perfect job that you just can't hope to get any other way. In Figure 12-2, you see the portrait knocked out of its studio background and placed against the natural background of a tree. You'd be hard pressed to guess that this photo wasn't actually taken in that location.
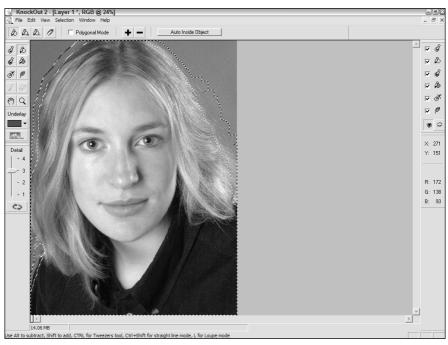
Figure 12-1: A flying hair portrait with a very complex background

Figure 12-2: The perfectly knocked-out portrait sporting a brand-new background

Complex extractions with Photoshop

Photoshop 6 introduced the Extract tool to perform basically the same functions as KnockOut, but with a much easier to understand interface and with the capability rolled right into Photoshop. Unfortunately, you don't get the Extract tool with Photoshop Elements. The following exercise shows you the basics of using this tool. Even if you don't have the program, reading this exercise gives you an idea of the possibilities.

The Extract tool is accurate and efficient as long as what you want to extract isn't too fuzzy and as long as the background isn't full of patches of color that are nearly the same color as a transitional edge. If you do have these complications, you may have to spend time practicing in order to get it right and even more time cleaning it up.

The most popular subject for knockouts is people and the most difficult thing to knock out cleanly is their hair. The picture of Jane, shown in Figure 12-3, is a good example to learn from, especially because her dark hair contrasts nicely with the light beige wall behind her.

1. **In Photoshop 6 or later, open the** `Jane 2.tif` **file from the book's CD.**

    The source image is shown in Figure 12-3.

Figure 12-3: Jane and her flying hair

2. **Choose Filter ⇨ Extract.**

The Extract dialog box appears.

3. **From the Extract dialog box toolbox, choose the Marker, which looks like the tip of a felt tip marker.**

You use this tool to define the width of the transitional area between interior and exterior objects. If the transitional area is wide (the edge is fuzzy or hairy), choose a big brush size by dragging the brush-size slider to the right or repeatedly clicking the] key.

Tip   This particular image has no smooth or close-to-smooth edges. If you're working on an image that does have such an edge, check the Smart Highlighting box in the Tool Options. As long as you keep the edge within the brush's circle, the marker will automatically adhere to the edge you want to highlight and that edge will fuzz out only as much as necessary to cover the transitional area.

4. **For this photo, cover everything that is in the transitional area with the marker.**

In this case, the transitional area consists of all the flying hair, as seen in Figure 12-4. If you have a hard time distinguishing the color of the marker from the colors in the photo, you can choose any primary RGB color from the Highlight menu in the Tool Options. You can do the same for the fill color.
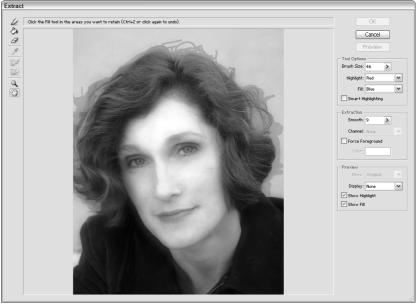
Figure 12-4: Jane in the Extract dialog box, after highlighting the transitional area and filling the foreground

5. **When you have finished placing the highlights, double-click the zoom tool and look for clean spaces of background color within the highlight.**

6. **Choose the Eraser tool and click inside the wider parts of the highlighted area to erase little spots that reveal the background color.**

This helps the program to know better what to extract (turn transparent) and what to leave in.

Caution   Be sure your highlighting completely surrounds the subject unless the subject is cropped at the edges of the frame. Otherwise, when you use the Fill bucket, the fill leaks out into the entire picture.

7. **Use the Fill bucket to fill the foreground.**

This ensures that the computer knows the difference between which colors should stay opaque, which should be transparent, and which should transition from transparent to semi-transparent.

8. **Click inside the highlight.**

One of two things happens: The fill color stays inside the highlight or it won't.

• If the fill color remains inside the highlight, what you see should look similar to Figure 12-5.

• If the fill color spills out, zoom in and examine the highlight for a break. Choose the Marker, and use it to close the gap that allowed the fill color to leak. As soon as you start to paint in the gap, the fill color disappears and you can fill in the gap. Then try the Fill bucket again. Just keep repeating this process until the fill is contained within the highlight. Your image should now resemble Figure 12-5.

9. **Click the Preview button.**

What you see probably looks something like what you see in Figure 12-6. If not, you may need more practice.

10. **Now you have some cleanup to do . . . maybe a lot. Wherever there are rough spots, use the Cleanup tool (fourth from the bottom) while pressing the Alt key to restore those parts of the picture.**

At this point, I usually click the OK button, and do the rest of the cleanup using the Background Eraser in Photoshop. If you're working on a subject with simpler edges, try experimenting with the Edge Touchup tool before you take the image back into Photoshop by clicking OK.
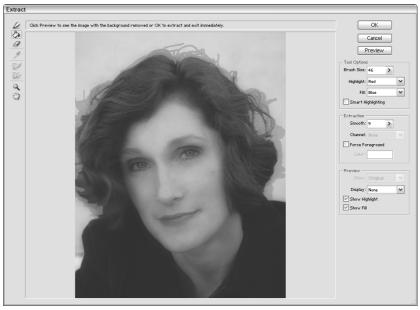
Figure 12-5: Ready to preview
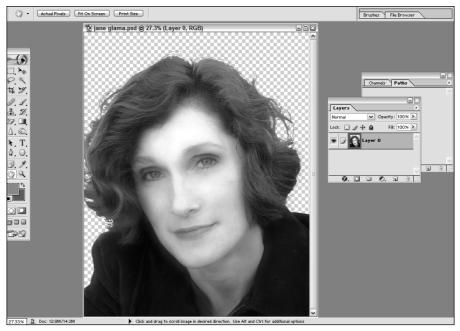
Figure 12-6: The preview of the first attempt at extraction

11. **Once you're back into Photoshop, use the Background Eraser and the History Brush to fine-tune your edges.**

Now you can place a new background behind the picture. I just made a new layer, filled it with a solid color, and used one of the lighting effect filters on it. You can see the result in Figure 12-7.

Figure 12-7: The finished portrait of Jane

Liquify

One of the reasons that Live Picture was so popular with commercial illustrators was its ability to do freehand distortions of the image. Having the ability to do freehand distortion is a lovely thing to have built in to an image-editing program because you can gradually re-size portions of the image in an infinite number of ways. Why on Earth would you want to? Imagine having the model in a swimsuit ad being able to loose two inches from her waist and half an inch from her thighs without having to pay either an airbrush artist or a plastic surgeon a small fortune? In the right hands and for the right account, that can be worth the price of the program alone.

You'll find other good reasons that it pays to be able to push, stretch, reflect, blow up, and wiggle pixels any time and in any way you want. It's a great way to make

caricatures and you can also use it to exaggerate features in landscapes, especially if you first removed those features from their backgrounds with the extract tool and then re-sculpted them before putting them back into place.

Perhaps the most useful application for being able to turn pixels to goo is that you can re-form objects to fit perfectly with other objects in a composite scene. There's a very famous photograph of a dragon that was made from a lizard and (I believe) a bat. The lizard's neck was stretched, his legs enlarged and bent, his claws greatly exaggerated and his tongue turned to flame. All of this was done with the help of the warping tools in Live Picture. Then, when it came time to attach the bat wings they were first carefully shaped so that they fit perfectly onto the lizard's body. When the picture was finished, you'd swear it was an actual photograph of a medieval monster.

The following exercise gives you an idea of how easily you can turn a docile creature into a monster.

1. **Open Photoshop 7 and the file** Kensportrait **from the book's CD, and then choose Filter ⇨ Liquify.**

   You see the Liquify dialog box with the toolbox on the left and the options on the right. In the center is the layer that was open when you issued the command, as shown in Figure 12-8.
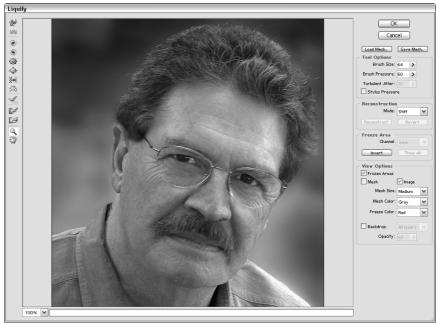
Figure 12-8: The Liquify dialog box showing the tools on the left and the options on the right

2. **Choose the Warp tool and push inwards to squeeze the top of my head.**

   This makes me a pinhead.

3. **Choose the Twirl clockwise and counterclockwise tools, center the cursor on the division between my lips, and click and hold.**

   This makes my mouth wrinkle up.

4. **Use the Warp tool to push out my neck and chin.**

   This makes my chin big and rugged and makes my neck bulge out, so that I look mean and tough.

5. **Use the Bloat tool to give me great big eyes.**

   To make my glasses grow with my eyes, press the square bracket keys to make the brush as big as the glasses. Then center the brush in the center of the eyeball, click and hold, and watch the eyes get bigger. When you are happy with the first eye's size, release the mouse button, and repeat the procedure on the other eye.

6. **Use the Pucker tool to suck my cheeks in, so I'll look even meaner.**

   After choosing the Pucker tool, center the cursor on the cheeks and press the left mouse button to draw the area inward. You can play with this quite a bit to vary the affect. You can also the same tool to make my mustache a handlebar.

   If you had fun messing me up you could keep it up forever, but you can see what the finished result resembles in Figure 12-9.

Two really powerful things about the Liquify environment: Meshes and Freezing. A grid that looks like graph paper is hidden from view when you're working in Liquify. As you push pixels around, the grid warps accordingly. Now, here's the magic. You can save that grid and use it again on an entirely different picture. Use this capability to do your liquifying on a smaller image. You could then open a very large version of the same image in Liquify and then load the mesh from the smaller version of the picture and apply it to the current version. Then you can go have a cup of coffee while the program liquifies the picture in the same way that it liquified the smaller version. To show and hide the mesh, you place a check mark in the box under the few options in the options side of the dialog box .To turn it off, deselect the options.

Turning Freezing on keeps areas of the picture from being affected at all by the Liquify brush. So if you want to protect certain areas from being warped, there are two things you can do. You can make a selection in the picture that covers the area you want to freeze before you open the Liquify dialog box. That area will be frozen when in the Liquify dialog box. (It's covered by a red area or *rubylith* mask.) Alternatively, use the freeze brush to paint a mask over the area you want to freeze while you're working in the Liquify dialog box.
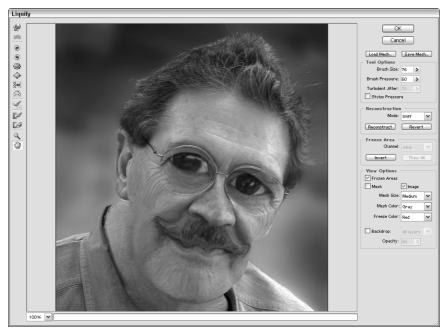
Figure 12-9: The pinheaded monster

Photoshop Blend Modes

Blend modes create special effects by applying mathematical formulas to the corresponding pixels on two or more layers of the image. They are especially useful for certain darkroom manipulations, such as burning, dodging, and contrast control. Blend modes are applicable to layers, brush strokes, and fills.

What follows is a brief description of each Blend mode, followed by a black and white image that resulted from blending the picture on the left in Figure 12-10 with the figure on the right. In other words, the figure on the left is the top layer, and the figure on the right is the bottom layer.

✦ **Dissolve:** This mode has no effect unless you reduce the opacity of the blended layer. If you do reduce the opacity, the effect varies according to the opacity setting. Pixels from the two layers mix in different random patterns depending on the opacity. Experiment with the Dissolve mode by dragging the opacity slider. This effect is shown in Figure 12-11.

Figure 12-10: The picture on the left is the top layer used for all the following blend modes. The picture on the right is the one the top layer is blended with.

Figure 12-11: With Dissolve mode, layers mix randomly depending on opacity.

✦ **Darken:** This mode keeps only the darkest colors visible on the interacting layers. In other words, any color that is lighter on one layer than on another is discarded. This effect is shown in Figure 12-12.

Figure 12-12: Darken mode keeps the darker color and throws out the lighter color.

✦ **Multiply:** This mode multiplies underlying visible colors by the blend color, resulting in a mix of pixels from both images, which is darker in overall tone than either original. This effect is shown in Figure 12-13.

✦ **Color Burn:** This mode increases the contrast between colors in the base image according to the colors in the blend layer and results in a very bright and high-contrast image. This effect is shown in Figure 12-14.

Figure 12-13: Multiply visible colors with Multiply mode.

Figure 12-14: Color Burn results in a high-contrast image.

✦ **Linear Burn:** This mode decreases the brightness of the underlying layer by the amount of brightness at any given spot in the overlying layer. Blending with white produces no change. This effect is shown in Figure 12-15.

Figure 12-15: Linear Burn mode decreases the brightness of the color.

✦ **Lighten:** This mode is the opposite of Darken. Only the lightest colors in the blend and base layers are kept, resulting in a lighter overall image than the original that blends pixels from both images. This effect is shown in Figure 12-16.

✦ **Screen:** This mode takes its name from the fact that this is the effect you'd get if you projected one image atop another using a pair of slide projectors. This is a multiply mode, but what's being multiplied is the inverse of the colors in the blend and base layers. You always get a lighter mix of colors than were originally contained in either the blend or base layers. Screening black and white leaves the colors unchanged. This effect is shown in Figure 12-17.
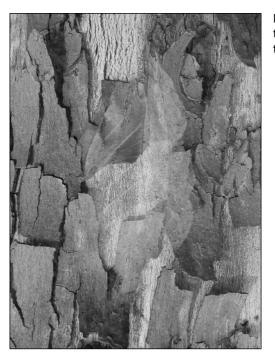
Figure 12-16: Lighten mode keeps the lighter color and throws out the darker color.

Figure 12-17: With Screen mode, one image lies atop the other.

✦ **Color Dodge:** This mode results in the base color being brightened by the brightness of the blend color and contrast being increased in any given area of the image. This effect is shown in Figure 12-18.
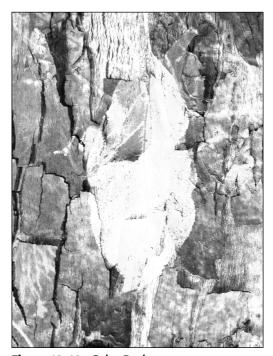
Figure 12-18: Color Dodge

✦ **Linear Dodge:** This mode causes the blend color to brighten the base color by cranking up its lightness according to its brightness. In other words, overall lightness is increased, but the extent to which it is increased in any given area depends on the specific colors on each layer in each given area. This effect is shown in Figure 12-19.

✦ **Overlay:** This mode causes the textures and colors of the blend layer to seem to shape the base pixels while maintaining the base layers highlights and shadows. This effect is shown in Figure 12-20.

Figure 12-19: Linear Dodge

Figure 12-20: Overlay mode maintains the base layers highlights and shadows.

✦ **Soft Light:** This mode boosts the brightness and the separation of detail in the shadows and results in the whole image being brightened. Soft Light is especially useful for burning and dodging on a transparent blend layer by painting in shades of gray. This effect is shown in Figure 12-21.

Figure 12-21: Use Soft Light mode to brighten the whole image.

✦ **Hard Light:** This mode screens colors that are lighter than 50 percent gray, and multiplies colors that are darker. Hard Light increases overall contrast. You can also use this mode for burning and dodging, but the results are much more extreme and pure black and white register only as pure black and white. This effect is shown in Figure 12-22.

✦ **Vivid Light:** This mode is closely related to Hard Light but is even brighter and has higher contrast. Lighter colors both lighten and increase saturation, while darker colors do the opposite. This effect is shown in Figure 12-23.

Figure 12-22: Hard Light mode increases overall contrast.
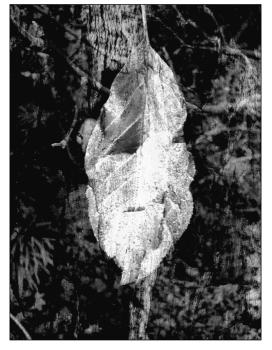
Figure 12-23: Vivid Light mode provides higher contrast than Hard Light mode.

✦ **Linear Light:** This mode works like Vivid Light except that blend colors affect base colors by brightness rather than contrast. Colors that are less than 50 percent gray get brighter, and colors that are more than 50 percent gray get darker. This effect is shown in Figure 12-24.

Figure 12-24: Linear Light mode affects base colors by brightness.

✦ **Pin Light:** This mode results in color being flattened and darkened. Blend colors lighter than 50 percent of that color replace those in the background, and blend colors darker than 50 percent of that same color don't affect the base. This effect is shown in Figure 12-25.

✦ **Difference:** This mode appears to produce a negative image. Blending with white inverts the base color, blending with black invokes no change. Otherwise the lightest color in either layer becomes the predominant color. This effect is shown in Figure 12-26.

Figure 12-25: With Pin Light mode, color is flattened and darkened.
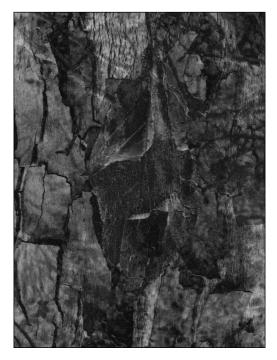
Figure 12-26: With Difference mode, the lightest color becomes predominant.

✦ **Exclusion:** This mode is a lower-contrast version of the Difference mode. This effect is shown in Figure 12-27.

Figure 12-27: Exclusion mode is a lower-contrast version of Difference mode.

✦ **Hue:** This mode maintains the blend color's hue, while the base colors keep their luminance (brightness) and saturation (vividness). This effect is shown in Figure 12-28.

✦ **Saturation:** This mode imposes the blend layers color saturation on the pixels in the base color. This effect is shown in Figure 12-29.
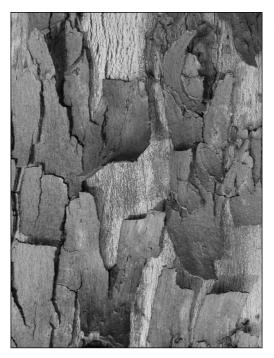
Figure 12-28: Hue mode keeps the luminance and saturation.
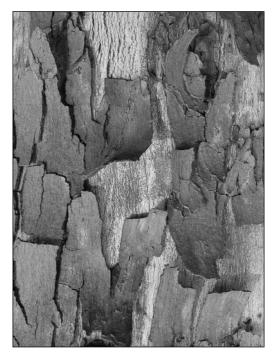
Figure 12-29: Saturation mode saturates the layers with color.

✦ **Color:** This mode keeps the shapes in the base layer the same, but they are colored by the colors in the blend layer. This effect is shown in Figure 12-30.

Figure 12-30: Color mode uses the colors in the blend layer.

✦ **Luminosity:** This mode is the reverse of Color mode. The shapes (brightness or luminosity) in the Blend layer stay pretty much the same, but their color and saturation are taken from the base layer.

✦ **Behind (paint only):** This mode paints only inside transparent or partially transparent areas of a layer.

✦ **Clear (paint only):** This mode acts just like the Eraser tool, except that you can use any brush settings to vary the effect.

Notable Effects with Plug-in Filters

One of the most famous (and infamous) characteristics of Photoshop (and now Photoshop Elements and many other non-Adobe image editors) is their ability to accept small, special-purpose programs called plug-in filters. Plug-in filters can perform almost any imaginable function, but they generally fall into one of three categories:

✦ Image correction

✦ Art effects

✦ Special effects

Photoshop comes with 99 different built-in filters that fit into these categories. You can also find hundreds of filters from third-party manufacturers that can be used in Photoshop as well as many other image editors, most notably Corel PhotoPaint, PaintShop Pro, Canvas, and Corel Painter. If your image editor is compatible with Photoshop plug-ins, that fact will probably be loudly advertised on its packaging.

Image-correction filters

Image-correction filters are those that somehow "repair" a photographic defect in the image or that imitate a particular photographic effect or lens.

Auto-sharpening filters

Five filters are included with Photoshop that bring more apparent sharpness to the image. The first four of these are automatics — that is, you have no direct control over the degree of their effect, except by applying them repeatedly to intensify their effect. All these filters do is, in one way or another, increase the apparent contrast between pixels. The four auto-sharpening filters are shown in Figure 12-31.

Figure 12-31: The original image and three auto-sharpening filters. From top left to bottom right: Normal, Sharpen, Sharpen Edges, and Sharpen More.

✦ **Sharpen:** This filter makes a slight boost in the contrast between adjacent pixels, without regard to edges.

✦ **Sharpen Edges:** This filter looks for adjoining rows of pixels of the same intensity and heightens the contrast between those rows of pixels. The more randomly mixed pixels and the more evenly colored pixels that are between these rows are left pretty much as they were. You have no control over what will be considered an edge or what edge width will be.

✦ **Sharpen More:** This filter is a more intensely contrasted version of the basic Sharpen filter.

Unsharp Mask

The Unsharp Mask filter actually provides you with considerable control over how sharpening will be interpreted. When you choose Filter ⇨ Sharpen ⇨ Unsharp Mask, the Unsharp Mask dialog box appears, as shown in Figure 12-32.
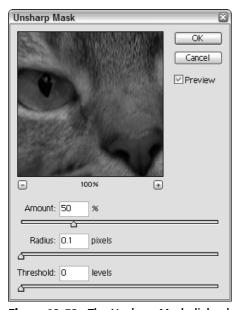
Figure 12-32: The Unsharp Mask dialog box

Three controls exist for the Unsharp Mask: Amount, Radius, and Threshold. The following list gives you some guidelines for using these settings — depending on whether your image is printed or displayed on screen — to improve the apparent sharpness of focus in the image.

✦ **Amount:** The Amount slider controls the increase in contrast between edges. (What is considered an edge can be controlled with the Radius and Threshold sliders.) You'll notice a difference as you drag the contrast slider higher, but

the differences in the image won't be nearly as dramatic as when you start experimenting with the other two settings.

✦ **Radius:** The Radius slider enables you to vary the thickness of edges that are sharpened. Generally speaking, lower radius values work better for screen images, such as presentations and Web images, because pixels are shown at a 1:1 ratio. Small radius settings in high-resolution images tend to increase the visibility of artifacts.

✦ **Threshold:** The Threshold slider sets the level of contrast that has to exist between adjacent areas before sharpening (increasing contrast) occurs. The lower the number, the more edges are sharpened. Conversely, the higher the number, the fewer the edges that are selected for sharpening.

You can also use the Unsharp Mask filter to purposely create exaggerated grain, artifact, and noise effects. When using these settings for pure effect, experiment with using the highest settings. Also, if you're really in an experimental mood, try using the Unsharp Mask filter on individual color channels. It's an excellent way to create grain and noise effects that can be quite beautiful.

Blurring

The functionality of the Blur tools can be divided into three categories:

✦ Minimizing noise, grain, or texture

✦ Selective focus

✦ Special effects

Minimizing noise, grain, or texture

The Blur filters that work best for minimizing noise, grain, and texture do so by slightly blurring the image. The trick is, you don't want to blur the edges — just the smoother and flatter colors. Sometimes you'll be able to get away with doing nothing more than issuing the Blur or Blur More commands to get instant, minimal smoothing. Figure 12-33 shows a portion of an original image on the left and the same portion of the image after one application of the Blur and Blur More filters.

Figure 12-33: The original image, Blur applied once, and Blur More applied once

If these filters soften the edges too much, see the Find Edges exercise in "Special effects blurring (Find Edges, Motion Blur, and Radial Blur)," later in this chapter, for a way to isolate the edges in the picture from the smooth areas that show the noise most predominantly.

Another option is to use the Smart Blur or Gaussian Blur filters. How to use Gaussian Blur is covered in the following section on selective focus, which is the most common use for this feature.

If you want to keep the edges smooth while blending the interior detail, use the Smart Blur filter. The Smart Blur filter offers you one way to maintain edge sharpness and minimize noise. If the Smart Blur filter gives you the effect you're looking for (and it often will), you may not have to resort to the masking tricks described in the Find Edges and High Pass filters, later in this chapter.

To use the Smart Blur filter, choose Filter ⇨ Blur ⇨ Smart Blur. The Smart Blur dialog box appears. Figure 12-34 shows the Smart Blur dialog box with the settings used in Figure 12-33.
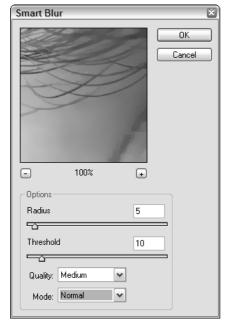
Figure 12-34: The Smart Blur dialog box

After you have accessed the Smart Blur dialog box, you can adjust the following settings:

✦ **Radius:** The Radius slider dictates how wide a row of similarly colored pixels must be in order to be considered an edge. For most images that have noise or defects in the lighter areas, a radius of between 5 and 10 is appropriate. (The actual number will depend mostly on the size of the image. Larger images can tolerate higher numbers.)

✦ **Threshold:** The Threshold slider determines the amount of blurring by stating how different adjacent pixels must be from each other in order to be considered an edge. You'll get more blurring if the threshold is set higher than the radius.

✦ **Quality:** To achieve the results shown in Figure 12-35, use the setting shown in Figure 12-34. (Set the Quality at Medium or High, choose Normal from the Mode menu, and click OK.)

Figure 12-35: The original eye and its appearance after applying Smart Blur

The edges maintain their sharpness pretty well after applying the Smart Blur filter. The Smart Blur filter won't give you as much control as you'd get from using an edge mask (see the exercises in the next two sections), but it's a workable solution if your requirements aren't too critical, and it's a lot easier and faster to use than having to work with an edge mask.

The Smart Blur filter can also be used as a special effect filter when more extreme settings are employed. Try using the Threshold setting above the halfway point and then setting the Radius at about half of that. You should get an effect that looks a bit like a watercolor painting, like the image shown on the right in Figure 12-36.

Figure 12-36: An image before (left) after (right) applying high Radius and Threshold settings in the Smart Blur filter

Selective Focus with Gaussian Blur

The Gaussian Blur filter gives you complete control over the amount of blurring that occurs. You drag a radius slider to increase the blurring over a specified number of pixels. Highlights tend to spread into shadows, so the Gaussian Blur filter is also good for "glamour glow" effects.

Most digital cameras have very short focal-length lenses. Short focal-length lenses result in images that are sharper over a greater range of distances than you can see from a lens of equivalent focal length in a 35mm camera. That's a great thing if you want the scene you're shooting to be sharp from your nose to the horizon. It's not so great if you want the viewer's attention to be focused on part of the subject.

Elsewhere in this book, the discussions of Gaussian Blur have centered around simply blurring the background. In this case, blurring the background is often simply a matter of extracting (knocking out) the foreground object and placing it on a new layer, and then blurring the background to whatever degree seems appropriate by using the Gaussian Blur filter. This process is a form of selective focus.

A more realistic approach to selective focus is to gradually blur the image as the objects or planes in that image get further from or closer to the camera lens than the part of the image that you want to keep in very sharp focus. As an example, I use my cat Tia. In Figure 12-37, I photographed Tia with a 3 megapixel Nikon 995 digital camera with the lens zoomed to about a 50mm equivalent. Despite the closeness of the camera, the image is in fairly sharp focus from front to back. What I really want is to focus on the eye and the closest part of her face.

Figure 12-37: The original digital photo of Tia

Solving this type of problem is easy. Select the part that you want to keep in focus, and then invert the selection and feather it so that when it's blurred, the blurring occurs gradually over the distance the selection is feathered. After the blur is done, take more out of the center of the selection so it now surrounds even more distant objects. Then feather the new selection edge again and then apply even more Gaussian Blur. Keep making more outward bound selections and using even more blur until the most distant objects are so blurred they're hardly recognizable. The following steps outline this process of created selective focus:

1. **Open the file** `Tia's Closest Eye` **from the CD-ROM, and select the area around Tia's closest eye and the closest part of her face.**

2. **Press Cmd/Ctrl + Shift + I.**

   This inverts the selection and makes it possible to blur the area outside the original selection.

3. **Choose Select ⇨ Feather.**

   The Feather dialog box appears, as shown in Figure 12-38. With the Feather dialog box, you can feather the edges of the selection so that the blurring is gradual as parts of the image fade further away.

Figure 12-38: Tia after inverting the first selection and choosing
Select ➪ Feather

4. **Enter a fairly large number of pixels in the Feather dialog box, and then click OK.**

   The number of pixels you enter depends on the overall size of your image — a typical number is around 20. This ensures the focus graduates slowly outward from sharp to blurred.

5. **Choose Filter ➪ Blur ➪ Gaussian Blur.**

   The Gaussian Blur dialog box appears, as shown in Figure 12-39.

6. **Drag the Radius slider to a fairly low number, and then click OK.**

7. **Choose the Freehand Lasso tool, press Alt, or choose the Subtract icon in the Options Bar.**

   To blur the more distant area even more, you want to cut a larger hole in the center of the selection.

8. **Feather the wider selection by choosing Select ➪ Feather.**

   This time, make the feather radius two to three times as wide as for the first selection.

9. **Choose Filter ➪ Blur ➪ Gaussian Blur.**

   This time, set the blur radius two to three times as high as the first time, as shown in Figure 12-40, and then click OK.

Figure 12-39: The first selection, feathering, and blurring

Figure 12-40: The second selection, feathering, and blurring

10. **Press Cmd/Ctrl + D to drop your current selection.**

11. **Use the Lasso to select the really far away portions of the top of the image.**

    Make sure you don't include foreground objects, such as Tia's ears.

12. **Feather and blur these more distant portions of the image even more.**

    You can see the final result in Figure 12-41.

Figure 12-41: The final selectively focused portrait of Tia

Special effects blurring (Find Edges, Motion Blur, and Radial Blur)

The Find Edges filter isn't, strictly speaking, a corrective filter; it's more a special effects filter. If you apply the Find Edges filter to an image, it not only finds the most prominent edges, but also places a "glow" effect around them. You can use a glow effect to create a softened edge mask that is very useful when you want to increase the apparent sharpness of focus on of the image itself, but don't want to sharpen interior surface textures.

For instance, in a portrait, you may want to sharpen hair, eyes, and eyelashes because they draw attention to the most communicative or sensuous parts of the face. At the same time, increasing the graininess of skin or sharpening blemishes could be most unflattering.

The same considerations exist in nonportrait photography as well. You may, for instance, want to see sharply defined building edges, curbs, and windows. At the same time, you may want interior details to be soft, foggy, and romantic.

The Find Edges filter can be a great help. You may want to use it in conjunction with the Blur and High Pass filters. The following exercise shows you how you can use it to make a mask (selection) that sharpens some edges and then, later, allows you to soften interior details. I'm sure you can think of many other ways to use this mask.

1. **Open the file** `Pigttoo` **from the CD-ROM.**

2. **Choose Window➪Channels.**

   The Channels palette appears, as shown in Figure 12-42. I want to create a mask, which is an alpha channel. The *alpha channel* is a channel beyond the primary color or composite channels.

Figure 12-42: The Channels palette after copying the Green channel

3. Click each channel to see which has the most contrast between edges.

As you can see from Figure 12-42, in this case, I chose the Green channel.

4. Drag the Green channel's Name bar to the New Channel icon at the bottom of the Channels palette.

5. Click the Green copy Name bar to make it active.

The image now appears in monochrome. You are now going to use the Find Edges filter to make something resembling a line drawing of the image.

6. Choose Filter ⇨ Stylize ⇨ Find Edges.

The darkest edges are sketched with a darker (close to black) line, as shown in Figure 12-43. You now want to reduce this to an absolute black-and-white line drawing.

Figure 12-43: The result of the Find Edges filter

7. Choose Image ⇨ Adjust ⇨ Threshold.

The Threshold dialog box appears. Now you want to turn the sketch that Find Edges made into a pure black-and-white sketch.

8. **Drag the slider until the black and white image shows exactly the detail you want to see, and then click OK.**

The result is shown in Figure 12-44.
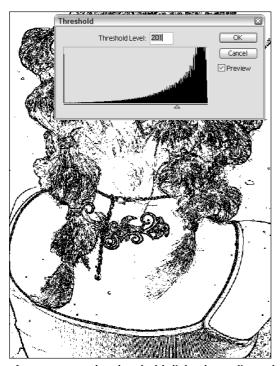
Figure 12-44: The Threshold dialog box adjusts the edges to keep

9. **Choose Image ➪ Adjustments ➪ Invert (or press Cmd/Ctrl + I).**

This reverses the image so that the edges become the selection.

10. **Use the Blur filter for the first time. Choose Filter ➪ Blur ➪ Gaussian Blur.**

The Gaussian Blur dialog box appears, as shown in Figure 12-45. This makes these edges wider and softer, so that the sharpening blends with the surroundings.

11. **Drag the Radius slider up to about 4.**

The actual setting depends on the size of your image and how wide and feathered you want your sharpening mask to be. When you're happy with what you see, click OK.
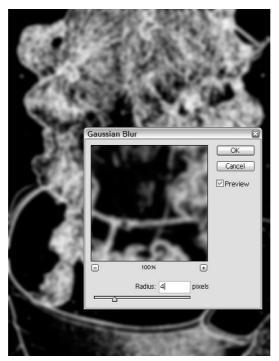
Figure 12-45: The Gaussian Blur dialog box and its effect on the mask

If you want to increase the contrast to make the white portions of the mask whiter, execute the following steps:

1. **Choose Image ⇨ Adjustments ⇨ Brightness/Contrast.**

   You should now have a very nice soft-edge black-and-white mask.

2. **Click the RGB channel so that you can see your entire image.**

   Now you are going to load your new mask as a selection.

3. **Choose Select ⇨ Load Selection.**

   A selection marquee appears, but I find it much easier to judge my results if I can't see the marquee. Press Cmd/Ctrl + H to hide the marquee.

4. **Choose Filter ⇨ Sharpen ⇨ Unsharp Mask.**

   The Unsharp Mask dialog box appears. Experiment with the settings. I usually check the Preview box so that I can immediately see the results on the whole box. Notice in the example that, while the hair and the tattoo are razor sharp, the skin is still soft and smooth. If I wanted, I could invert the selection (press Cmd/Ctrl + Shift + I) and further soften the skin.

There are two Blur filters that make it appear as though either the camera or the subject are moving so fast that the motion couldn't be frozen:

✦ **Motion Blur:** Creates a lateral blur, the width and angle of which you can control.

✦ **Radial Blur:** Two filters in one: Spin and Zoom:

- **Spin:** The Spin filter swirls the pixels around as if they were going down the drain. The Amount slider controls the apparent speed of the whirling movement. The Spin filter is excellent, when used inside a circular selection, for making wheels, propellers, or dance circles appear to be in motion — even though you may have shot them standing still. See Figure 12-46 for an example of the effect. By selecting only the area that I want to make spin and carefully centering the Blur Center over the wheel spokes, I created the illusion that one bike wheel is spinning.

Figure 12-46: A spinning bicycle wheel

- **Zoom:** The Zoom filter blurs in straight radial lines. You can position the axis of these radial lines so the resulting zoom effect makes it look as if the viewer were speeding toward that center. As is often the case with motion filters, the illusion can be much richer if you duplicate the original layer, blur the duplicate, and then lower the opacity so that you can see through the blur to the unblurred objects in the picture, as shown in Figure 12-47.

Figure 12-47: The Radial Blur dialog box with the Zoom filter applied makes it look as though you're flying toward the end of the dock.

High Pass

The High Pass filter is another excellent filter for making line drawings of edges. Line drawings can be much more varied in feeling, contrast, and thickness than those made by other filters that find edges. (Photoshop has quite a few of these filters: Trace Contour, Glowing Edges, and Find Edges.) The important difference is that by using the Find Edges filter in conjunction with the Threshold command, you can create a huge variety of edge effects, masks, and edge-blending effects with this one filter.

With this exercise, I show you the versatility of the High Pass filter in creating edge effects and then use these edge effects to emphasize edges and to change their color and contrast by using them in conjunction with Blend modes.

1. **Load the cacti image from the CD.**

2. **Make sure the Layers palette is visible. If not, choose Window ⇨ Layers.**

3. **Duplicate the background layer by dragging it to the New Layer icon at the bottom of the Layers palette.**

4. **Choose Filter ⇨ Other ⇨ High Pass.**

    The High Pass dialog box appears, as shown in Figure 12-48.
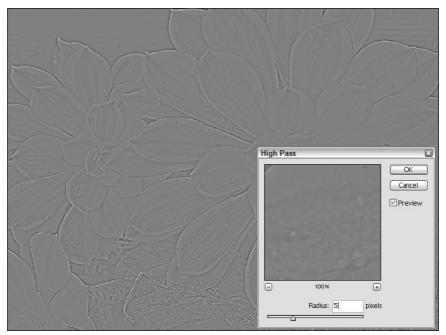
Figure 12-48: The High Pass dialog box with the Radius slider set so that only the most highly defined edges can be seen

5. **Drag the Radius slider back and forth.**

   Notice the smaller the radius, the more the interior details turn gray and the more highly defined the edges become. If you drag the slider all the way to the right, you see the entire picture. In this instance, drag the slider to a radius of about 4 or 5 pixels.

6. **Choose Image ⇨ Adjust ⇨ Threshold.**

   The Threshold dialog box appears, as shown in Figure 12-49. Change this grayscale image to something that looks like a line drawing.

7. **Very slowly slide the Threshold slider from left to right and carefully watch the changes in the image.**

   You may want to spend a month or two experimenting with the possibilities in this routine, but for the moment, stop when you see an effect that you like.

There are now endless possibilities as to what you can do with this line drawing. Here's a list of a few:
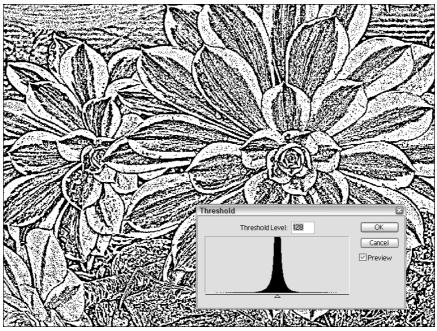
Figure 12-49: The Threshold dialog box and the resultant line drawing at this setting

✦ **Turn the line drawing into a coloring book.** Call up the Swatches dialog box so you can change colors easily. Choose the Paint brush, and in its Options bar, set the blend mode to Darken. Any of the white areas in the image fill with the current foreground color, while the outlines stay black.

✦ **Run through the Layer Blend modes by choosing the Move tool and then pressing Shift and the + key repeatedly.** You are going to be stunned by how many of these effects you'd be happy to hang on your wall or make a greeting card from. But wait! That's not all. While the line drawing layer is still selected, press Cmd/Ctrl + I to invert the image to a negative. Now use the same technique to run through the Blend modes again. You can have even more fun by changing the opacity of the Blend layer and cycling through the Blend modes even one more time.

✦ **Color the original line drawing layer by choosing a foreground color, and then choosing Edit ⇨ Fill.** The Fill dialog box appears. Choose Lighten from the Blend menu. All the Black lines changes to the current Foreground color. Now try changing Blends and Opacity. Particularly, try the Dissolve mode at different opacities.

✦ **Create a selection from a high contrast version of the photo.** To do this, change the image back to a black and white top layer. Press Cmd/Ctrl + A, and then Cmd/Ctrl + C to copy the line drawing to the clipboard. Now, make the Channels palette visible. At the bottom of the Channels palette, click the New Channel icon. A new, empty Channel Name bar appears. Click to activate the new channel and press Cmd/Ctrl + V to paste the line drawing into the new channel. You can now use this channel as a mask or convert it to a selection. (See the Find Edges exercise in the "Special effects blurring (Find Edges, Motion Blur, and Radial Blur)" section, earlier in this chapter.)

Noise

The last of the filter categories whose intent is primarily to help you correct images are those on the Filter ⇨ Noise menu. These filters include Add Noise, Despeckle, Median, Pixelate, and Dust & Scratches.

Add Noise

The Add Noise filter is your primary means of matching the grain in a composite image or when you've blurred the background in an image in order to get selective focus. Apply the Add Noise filter before you flatten the layers that you blurred, but if needed, you can always use the Extract filter or use the Background Eraser to separate the foreground from the blurred background. Then select the layer that is blurred and choose Filter ⇨ Noise ⇨ Add Noise. In the resultant Add Noise dialog box, check the Gaussian box and drag the slider to a low enough number to match the grain in the foreground image, as shown in Figure 12-50. You'll be amazed at how much more unified your image looks.

Note   Although it's not officially meant for this purpose, the Artistic ⇨ Film Grain filter can be a very effective substitute for the Add Noise filter and provides a different set of controls for matching grain and noise. Check it out.

Despeckle

Use the Despeckle filter for getting rid of noise, grain, and (mostly) moiré patterns that result from scanning or digitally photographing images that have been screen printed. In digital photography, it is most often used to minimize the noise that results from cranking the camera's ISO sensitivity to too high a level, shooting at very long shutter speeds, or using lower-quality levels of image compression (usually in order to try to squeeze more images onto a single card). The Despeckle command does not add noise; it removes noise by slightly blurring all but the edge pixels. The idea is that because the edges are still sharp, the picture has the illusion of sharpness. However, the chunky discolored pixels that make up the noise are blurred just enough to blend them together.

Figure 12-50: The Add Noise dialog box set so
that the grain in the blurred background matches
the grain in the foreground portrait

The problem with Despeckle is that you don't get any control. You choose Filter ⇨
Noise ⇨ Despeckle and the result is automatic. You can execute the command sev-
eral times, but past a certain point the edges become unacceptably soft. When you
reach that point depends on subjective variables, so you have to experiment.
After all, a person who is afraid to experiment never reaches their potential as
a photographer.

Dust & Scratches

Use the Dust & Scratches filter to remove stuff that seems irresistible to the glass
surface of scanners and to the celluloid surface of film that has been scanned.
Without the Dust & Scratches filter (and the new Healing and Patch brushes in
Photoshop 7), anyone who spends much time with a scanner can plan to spend
lots of time retouching the artifacts left by dust and scratches. The Dust &
Scratches filter dialog box is shown in Figure 12-51.

Be sure not to use the Dust & Scratches filter on the entire image at once. Why? Because Dust & Scratches is really closely related to the Smart Blur filter. It tries to preserve edges while blurring the image, which it does pretty well. But you're still going to end up with a picture much closer in sharpness to the original if you restrict the blurring to the areas of flat smooth color where the blurring doesn't matter much. If a few specks are left over here and there, clean them up with the Clone tool or move the surrounding texture over them with the Healing and Patch brushes.
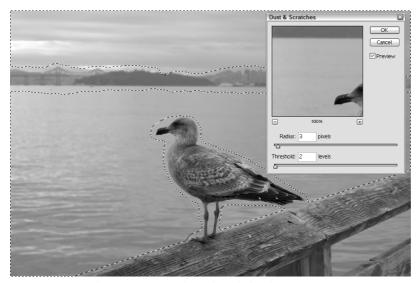
Figure 12-51: The Dust & Scratches filter dialog box

The following steps outline how to use the Dust & Scratches filter:

1. **Choose the Freehand Lasso tool and the Add Selection icon from Freehand Lasso tool Options bar.**

2. **Select the edgeless areas of the image that contain dust and scratches.**

3. **Choose Select ⇨ Feather.**

4. **In the Feather dialog box, drag the radius slider to a fairly small number.**

   The number should be just enough so that the slight blurring that takes place inside the selections and blends smoothly with its surroundings.

5. **Choose Filter ⇨ Noise ⇨ Dust & Scratches.**

   The Dust & Scratches dialog box appears.

6. **Drag the sliders until they are in approximately the same position as shown in Figure 12-41.**

   If you overdo it, you get an objectionable level of blurring.

7. **Press Cmd/Ctrl + D to drop the selection.**

8. **Choose the Healing brush.**

   Press Alt and click to anchor the point where the surface texture pattern is picked up. Paint out any scratches that remain. Two reasons why you may find remaining scratches: They were too large to eliminate without objectionable blurring or they were outside the selection because they were inside areas of critical sharpness.

Art effects filters

The Art effects filters attempt to imitate traditional painterly styles and brush strokes by doing a variety of things to reinterpret the "look and style" of the image. On their own, they can be an effective means of turning a photograph into a stylized illustration. However, a single pass is generally worthy only for use as a "highlight" illustration on a Web page or for some other "quick effect" or attention-grabbing use. Art effects can also be effective when used to give a style to text and buttons. If your intention is to turn photographs into paintings, it is generally better to create different effects (or different settings of the same effects) on different layers of the image. You can then delete, erase, change the opacity, or any combination to give a much more professional and "hand-done" look to the image

Thirty-seven built-in Photoshop filters can be described as art effects, divided into three sub-menus: Artistic, Brush Strokes, and Sketch (mostly black and white). You will find more specific detail on these filters in Chapter 14.

Special effects filters

A few built-in filters create effects that can be made to look as though they were part of the original photograph. These include the Lens Flare, Lighting Effects, 3D Transform, Texturizer, and Offset filters.

Lens Flare

The Lens Flare filter makes the photo look as though the brightest light source in the image was aimed directly into the camera lens. With it, you can very quickly create the feeling the picture was taken on a hot and sweaty day at sunset or the car headlights were blinding you just before you were run over by the car.

The following steps outline how to use to use the Lens Flare filter:

1. **Choose Filter ➪ Render ➪ Lens Flare.**

   The Lens Flare dialog box appears, as shown in Figure 12-52.

Figure 12-52: The Lens Flare filter and its effect

2. **In the Preview window, drag the center of the lens flare to the point where you want to see it in the picture.**

3. **Choose the style of lens flare you want by choosing a lens focal length from one of the Lens Type radio buttons.**

4. **Drag the slider to determine the size of the lens flare.**

Lighting Effects

The Lighting Effects filter can produce very dramatic effects that look as though carefully controlled studio lighting has been applied to the surface of the picture. Light sources can be individually controlled by type (directional, omni, and spotlight), size, shape, color, intensity, glossiness, and overall ambience. You can even use another photograph to texture the image, so the texture seems to be reinforced by the direction of the lighting. Figure 12-53 shows the result of using the Lighting Effects filter as well as the settings you can adjust from the Lighting Effects dialog box.
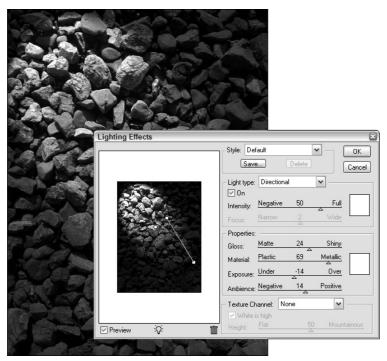
Figure 12-53: The Lighting Effects dialog box

3D Transform

The 3D Transform filter actually bends the current layer to the shape of a number of geometric surfaces, such as spheres, cylinders, cones, and cubes.

1. **To do a 3D transformation, choose Filter ➪ Render ➪ 3D Transform.**

   The 3D Transform dialog box appears as shown in Figure 12-54.

2. **Drag the shape to the size you want in order to project the image onto it.**

3. **Choose a pen tool to alter the shape by dragging points.**

   This is done just as you would any vector shape or path when drawing or editing vector shapes or paths in Photoshop or in an illustration program.

4. **Choose one of the rotation tools (the spheres near the bottom of the palette).**

   The image glues itself to the surface of the shape. You can then choose an angle of view and can move in and out on the shape.

5. When the 3D shape is just as you want to render it, click OK.

You can then transform that layer to fit the apparent surface of another layer. So you can, for instance, have this leaf pasted around the cylindrical curve of a person's arm or leg. Be warned though, getting it right takes some practice.
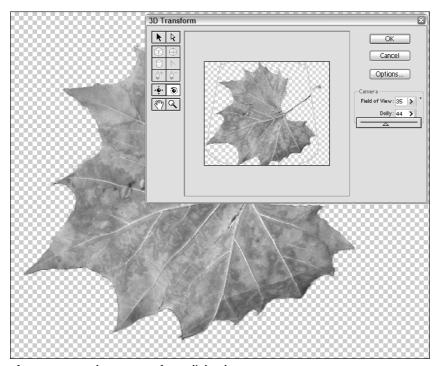
Figure 12-54: The 3D Transform dialog box

Texturizer

The Texturizer filter allows you to use any Photoshop-compatible image as a texture pattern for the currently active layer. This is an amazingly versatile and powerful tool. Here's how the Texturizer filter works:

1. Open the image you want to texturize (or select the layer).

2. Choose Filter ⇨ Texture ⇨ Texturize.

The Texturizer filter dialog box opens, as shown in Figure 12-55.

3. Choose from any of the standard textures (Brick, Burlap, Canvas, or Sandstone) by picking them from the Texturizer menu.

4. **If the standard textures don't meet your needs, you can choose Load Texture.**

   If you choose Load Texture you get a file browsing dialog box that lets you load any file on your computer as a texture. This texture is always treated as a monochrome photograph and lighter areas are interpreted as raised while darker areas are treated as depressed when the image is used to texturize the currently active photo.

5. **Choose the Light Direction from the menu.**

   The light direction consists of any 45-degree angle.

6. **Adjust the scaling of the original image and the depth of the texture (relief) by dragging the two sliders.**

7. **When you see what you want in the Preview window, click OK.**
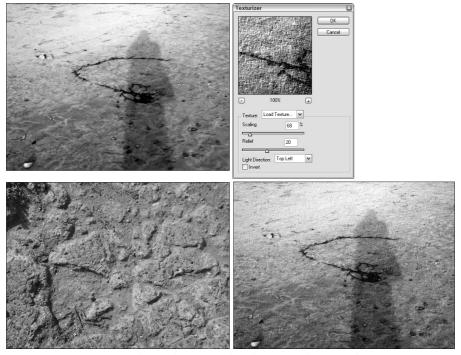
Figure 12-55: From top left to bottom right: the original image, the Texturizer dialog box, the image that was loaded for texturizing, and the final result

Offset and tiling

The Offset filter is the secret to making seamless tiles, which are small photos that match up from side-to-side and top-to-bottom so that when they're aligned in rows and columns they appear to be one solid texture or pattern. The most frequent use of tiles is backgrounds for Web pages or printed material. However, tiles can also be very useful for covering areas such as unwanted windows in a building, which creates the effect of a blank wall. They can also make good backgrounds for portraits and product shots.

Seamless tiles are easy if they consist of an object on a plain background. All you have to do is open the tile file:

1. **Choose Select ⇨ Select All or press Cmd/Ctrl + A.**

   This places a marquee around the image that you are going to use as a tile.

2. **Choose Edit ⇨ Define Pattern.**

   You are now ready fill an area with that pattern.

3. **Select the area (or layer) that you want to fill with the pattern.**

4. **Choose Edit ⇨ Fill.**

   The Fill dialog box appears, as shown in Figure 12-56.
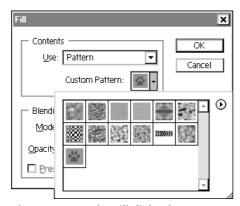
Figure 12-56: The Fill dialog box

5. **Choose Pattern from the Use menu.**

6. **Choose the pattern you want to fill with from the Custom Pattern menu.**

7. **Click OK.**

   The area that you want to fill is covered with your seamless tile, as shown in Figure 12-57.
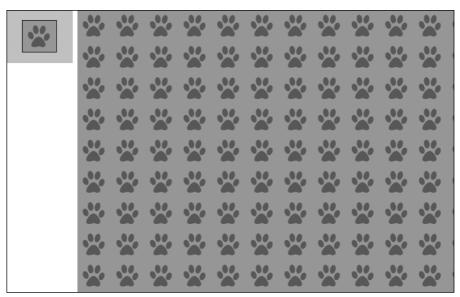
Figure 12-57: The seamless tile before and after being used to fill an area

The tricky part comes when you have a real-life texture, such as a photograph of stucco or a pebbled mosaic, that you want to turn into a seamless pattern so that you can use it almost anywhere.

> **Tip** When you're photographing textures that you want to turn into seamless tiles, be sure to photograph a section of that texture in which the shapes, colors, and lighting are as uniform as possible. Also, try to be sure that your camera is as perpendicular to the surface as possible.

In this example, I use a close-up photo of a pebbled sidewalk for a picture. To turn this into a tile that I can fill an area with so that it doesn't look like a sea of small squares, I use the Offset filter. Here's how you'd go about it:

1. **Open the** `pebbles` **file from this book's CD-ROM.**

   You actually want a much smaller pattern of pebbles, so cut the size of the image in half.

2. **Choose Image ➪ Image Size.**

   The Image Size dialog box appears.

3. **Enter** 2.25 **in the Height field, make sure that Constrain Proportions and Resample Image Bicubic are selected, and then click OK.**

4. Choose the Marquee tool, and press Shift while dragging to enclose a square selection.

Tiles usually fill more uniformly when they're square, but it's not necessary to always have a square tile.

5. After the marquee appears, drag it around inside the image until the area includes the most uniform-looking group of pebbles.

Try to leave out pebbles that stand out because of brightness, size, or color because they signal that the pattern is repeating when it is used to fill an area.

6. Choose Filter ➪ Other ➪ Offset.

The Offset dialog box appears, as shown in Figure 12-58. Overlap the contents of the selection so that it wraps around and meets in the middle. The edges of one tile perfectly match the edges of the next — ensuring the fill is seamless.
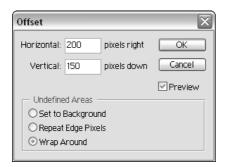
Figure 12-58: The Offset dialog box

7. Enter figures in the Horizontal and Vertical offset fields until you see a seam dividing the contents of the marquee in quarters, as shown in Figure 12-59.

8. Press Cmd/Ctrl + C.

This copies the contents of the selection to the clipboard.

9. Press Cmd/Ctrl + N.

A new window opens that is the same size as the contents of the clipboard.

10. Press Cmd/Ctrl + V.

This pastes the contents of the clipboard precisely into the new file.

11. Choose the Clone tool.

You can use the Clone tool to get rid of the seams that criss-cross the image as a result of the overlap.
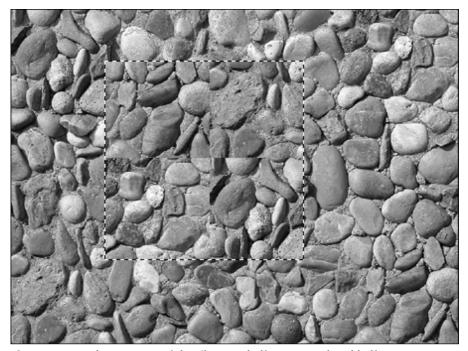
Figure 12-59: The contents of the tile wrap halfway around and halfway across

12. Press Opt/Alt.

A cross-hair appears in the center of the brush cursor. Place the intersection of the cross hair over the spot you want to clone from, and click. You have now designated the pickup point.

13. Clone to blend over the seams until the seams disappear.

You should clone over any pebbles that are too easy to visually single out. You can see the result of my cloning in Figure 12-60.

14. Now define this tile as a pattern. Press Cmd/Ctrl + A to select the entire tile.

You see a marquee appear all along the outer edges.

15. Choose Edit ➪ Define Pattern.

The Pattern Name dialog box appears, as shown in Figure 12-61.

16. Enter a name for your new pattern.
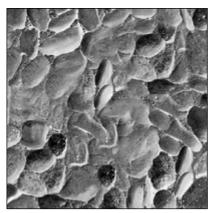
Figure 12-60: The clone-blended tile

Figure 12-61: The Pattern Name dialog box

17. To test your pattern, choose File ➪ New.

The New File dialog box appears.

18. From the Preset Sizes menu, choose 800 x 600.

19. Fill the new file with your pattern to test its seamlessness, by choosing Edit ➪ Fill.

The Fill dialog box appears, as shown in Figure 12-62.
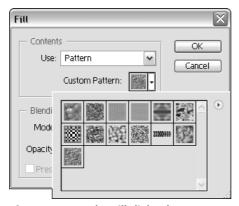
Figure 12-62: The Fill dialog box

20. **Choose Pattern from the Use menu, select your new pattern from the Custom Pattern thumbnails flyout, and then click OK.**

Your tiled texture should look something like Figure 12-63.
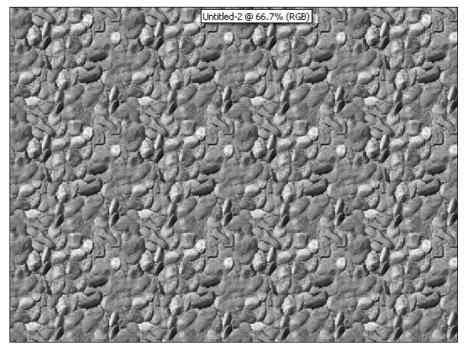
Figure 12-63: The test fill of the new pattern

Now you know the basics for making seamless patterns. Now you can make grass on lawns, sand on beaches, and plaster stucco over unwanted windows or ivy.

Special Third-Party Filters

The following sections provide some examples of tasks that various third-party plug-ins can accomplish. In particular, I have focused on things that would have been difficult to duplicate using Photoshop's built-in filters.

Kai's Power Tools

Kai's Power Tools are by far the most popular (and quite possibly, as a result, the most overused) series of Photoshop-compatible plug-ins. These products made

MetaCreations famous — at least until it acquired Painter. Now MetaCreations has sold most of its products to Corel. The KPT series of filters now sold by Corel and its subsidiary, Procreate, are KPT5 ($149), KPT 6, and KPT Effects.

KPT5

KPT5 consists of ten special effects filters and each of these is capable of infinite adjustments and most are sub-divided into sub-sections. The ten special effects filter categories or interfaces are called Blurrrr, FiberOptix, FraxFlame, FraxPlorer, Frax4D, Noize, Orb-It, RadWarp, Smoothie, and ShapeShifter.

Blurrrr

Some very cool capabilities are included in this blur filter. The helicopter shown in Figure 12-64 is a model that I shot in my studio. With the KPT5 Blurrr tool, I was able to dramatize its flight. The helicopter was hanging from a nylon string against a blue background when it was photographed. I then knocked it out with Corel KnockOut2 and placed one of my favorite cloudscapes behind it. By isolating the propellers with elliptical selections, I was able to spin the propellers with the Spin and Spiral blur commands. Then, without having to first make a selection to limit the blur, I use the High Speed blur to make the helicopter look like it's speeding.

Figure 12-64: The model helicopter in KPT motion

A star-filter effect in Blurrrr is well worth using for formal portraits, wedding photography, and evening night scenes. An example of it is shown in Figure 12-65.

Figure 12-65: The Gaussian Weave blur in KPT5 blur, which was subtly applied to a duplicated layer whose opacity was then reduced to about 15 percent

Noize

The Noize filter enables you to specify a color gradient, which colors an endless variety of noise patterns. The patterns can be superimposed on your current layer, but they're most useful when generated on an overlying layer. You can then experiment with blurring and blend modes, an example of which is shown in Figure 12-66.

Figure 12-66: Colored noise when applied to the silhouette of a Berkeley neighborhood at sunset

KPT6

KPT6 has ten effects categories: Equalizer, Gel, Goo, LensFlare, Materializer, Projector, Reaction, Scene Builder, Sky Effects, and Turbulence. The names of these filters are fairly self-descriptive. You may guess that this is the most all-around useful-to-photographers of all the KPT filters. I suppose that depends on your photographic style and personal style, but nevertheless, it's safe to say that this is a very versatile set.

Sky Effects

Sky Effects is actually a filter that was acquired for use in KPT6 from another company. With it, you can create just about any kind of sky from any sun angle, time of year, cloud cover, sunlight color, and more. You can control the focal length of the camera lens, so you can match the angle of view on the sky with the angle of view in your original picture. You can also tilt the camera up and down, which helps in matching the horizon line in your original picture.

To use Sky Effects effectively, knock out your skyline (I prefer the Photoshop Background Eraser or using a channel mask for that purpose), and place the foreground on its own layer. Then create a new layer that holds the sky effect. Then you can scale and position the result of the Sky Effects exactly the way you like it. Figure 12-67 shows the same neighborhood as in Figure 12-68, but with the sky generated by KPT6 Sky Effects.

Figure 12-67: Sky by KPT6 Sky Effects

LensFlare

KPT6 adds a whole library of lens flare effects to your photos. You can choose between several types of video cameras and several lens focal lengths (one or the other, not both). You can change the size of the halo, the brightness of the flare, and so forth. An example of the type of effect that you can create is shown in Figure 12-68. The LensFlare feature is definitely the way to go if you want total control over lens flare effects.

Figure 12-68: KPT6 lens flare from a fictitious flashlight aimed out a car window

Texturizer

This makes the Texturizer filter in Photoshop look weak-kneed. You can use any channel or any loaded image as a texture map. You have complete control over the reflectivity of the surface and complete control over depth, coloring, and lighting. Figure 12-69 shows you one example of what Texturizer can do.

Andromeda Photographic filters

Andromeda makes enough special-purpose filters to write a whole book about them. For now, I'm sticking to those that are especially suited to use in digital photography. Of all the Andromeda Filters, I find most useful the Photographic Filter, the Lens Doc filter, and the brand-new Scatter Light filter.

Lens Doc

Lens Doc fixes the barrel distortion inherent in many digital camera lenses. You place markers to show the program how the perspective and lens distortion must be straightened. Then (in each instance) you click a button to tell the program to proceed. In Figure 12-70, you can see the result of the corrections made to one image originally taken with a Nikon 995.

Figure 12-69: The texture of a rain-flooded window superimposed over a photo of a rain-drenched street using KPT 6 Texturizer

Figure 12-70: The original image (left) and the result of correcting perspective with the Andromeda Lens Doc filter (right)

Photographic filters

The photographic filters are a whole set of filters that produce effects typically made by the special effects filters used on a camera lens. These filters include such traditional photo effects as "star glint" highlights and a highlight diffusion filter, which is a bit more versatile than Photoshop's Diffuse Glow filter but not as variable as the Scatter Light filter described in the next section. Other photographic filters include reflections, which can make one portion of the image look like it's reflecting another portion, and a Velocity filter for motion blurs.

Scatter Light Filter

This is much more that just the typical portrait diffusion filter (a powerful version of which is also included). This filter also provides starlight, fog effects, and a "dream effects" setting that actually applies the effects only to the brightest areas of the image, creating a Rembrandt-like effect.

Summary

In this chapter, I show you how filters and plug-ins can be used to correct and enhance certain aspects of your digital photographs. This is but a small sampling of such tools, but it gives you a good bit of insight as to how powerful and flexible such tools can be.

✦   ✦   ✦

Advanced Image Editing

I t's an endless cycle: Microsoft and Apple make operating system updates available, and you take advantage of their offers so you can stay on the cutting edge. Then you find out that your favorite software packages don't work in the new OS. As a result, you are forced to either work in the old OS or make do without your favorites. Sometimes the software updates happen quickly, but other times, you wait for months to receive the newest versions.

Adobe has finally released Photoshop 7.0 so you can work comfortably in Windows XP and Mac OS X without being denied one of the bread-and-butter programs. The nicest part is that Photoshop wasn't made OS-specific, so you can run it in older versions of your operating system. You *can* have your cake and eat it, too!

Beyond writing the enormous amounts of code necessary to run in all these platforms, Adobe went a step further by developing what will more than likely become an industry standard: Extensible Metadata Platform, or XMP. This technology embeds information in your files so you can quickly repurpose, archive, and add your Photoshop 7 files to automated publishing workflows.

XMP takes the *metadata* (a 25-cent word for *file information*) that's used by the Newspaper Association of America (NAA) and the International Press Telecommunications Council (IPTC) to identify images and text that have been transmitted from the source to the newspaper. This metadata includes captions, keywords, credits, origins, and categories. On the Windows platform, you can add metadata to PSD, TIFF, JPEG, EPS, and PDF formats. Mac users can add the information to any of the file formats that Photoshop produces.

You can add a lot more information to your metadata file, as shown in Figure 13-1. For example, when I take a photo with my Nikon 950, the metadata list tells me whether the flash went off, the f-stop and aperture, the date and time, the size of the file in both pixels and kilobytes, and the color mode. To top it off, you can input the photographer's name, copyright information, a URL, and an e-mail address. The metadata stays with the file even when it's placed in a page layout program.

Model: E950	
Orientation: Normal	
X Resolution: 300.0	
Y Resolution: 300.0	
Resolution Unit: Inches	
Software: v981-77	
Date Time: 2001:04:02 09:13:28	
yCbCr Positioning: Cosited	
Exposure Time: 1/276 sec	
F-Stop: 11.0	
Exposure Program: Normal program	
ISO Speed Ratings: 0	
ExifVersion: 0210	
Date Time Original: 2001:04:02 09:13:28	
Date Time Digitized: 2001:04:02 09:13:28	
Components Configuration: Unknown	
Compressed Bits Per Pixel: 4.0	
Exposure Bias Value: 0.0	
Max Aperture Value: 2.6	
Metering Mode: Pattern	
Light Source: Unknown	
Flash: Did not fire.	
Focal Length: 19.0 mm	
FlashPix Version: 0100	
EXIF Color Space: sRGB	
Pixel X Dimension: 1600	
Pixel Y Dimension: 1200	
File Source: DSC	
Scene Type: Direct Photographed Image	

Figure 13-1: Metadata tells you more about an image than you thought you could know.

File Browser

You have a new way to open and manage files in Photoshop. When you go to the File menu, you're used to seeing New, Open, and Open Recent, but now you also see Browse. When you select Browse, a window pops up that is divided into four panes:

✦ A Tree View of your hard drive

✦ A Thumbnail pane

✦ A Preview pane

✦ A Metadata pane

The File Browser is docked in the Palette Well at the right end of the menu bar. You can either keep it docked or you can remove it from the Palette Well and use it as

a moveable panel, in which case, you have more options regarding the size of the panel. After you've used this file opener two or three times, you'll wish every program had a file browser like this.

Tree View

The Tree View will be very familiar to Windows users — it's the same view you get as you navigate through windows looking for files. Mac users may find it a little bit confusing at first, but it only takes a minute or two to see how easy it is to zip through your hard drive. You can move folders and files around in this window. There's even a Batch Rename feature for zipping through multiple files.

Thumbnail

One of the absolute best new features in Photoshop 7 is the fact that all the images that used to show up on my desktop as QuickTime icons (the generic showing from my digital camera) now show up as color thumbnails. The new Thumbnail pane in the File Browser shows all the files that Photoshop can open. Each thumbnail is relatively large (about two inches square at the "large" option), and the name of the file appears beneath each thumbnail. You can change the name and location of the file in this thumbnail state. You change a file's location by dragging the thumbnail to another folder in the Tree pane. If an existing file with the same name is in the new folder location, Photoshop asks if you want to let it Auto Resolve the conflict, in which case it adds numbers to the end of the filename so that no files are deleted. If an image is rotated, you can correct its orientation by clicking an arrow at the bottom of the window. This action doesn't change the file unless you open the file. At that time, Photoshop rotates the image as you have done with the thumbnail. If you open the file and close it again without saving it, the rotation is nullified.

You can view the Thumbnail pane in several different ways:

✦ **Small:** If you choose Small from the drop-down menu at the bottom of the Browse window, you see icon-sized images to the left of filenames. You can select a rotated image and change its orientation just as you do with the larger views.

✦ **Medium:** The Medium view provides images about 60 pixels wide. The images are arranged in rows and columns according to the width and height of the window that you created for them.

✦ **Large:** Choose the Large view to see thumbnails about 120 pixels wide.

✦ **Large with Rank:** Large with Rank uses the same view and filename as the Large view, but adds a Rank beneath the filename. (See the next paragraph for more on ranking images.)

✦ **Details:** The Details view has medium-sized thumbnails on the left with metadata information displayed on the right.

Another drop-down menu appears at the bottom of the small thumbnail pane, which allows you to view the list of images in a dozen orders, including Date Created, Date Modified, File Size, Copyright, File Name, and Rank. Also new in Photoshop 7 is the ability to rank your images, which only means that you can apply a modifier name to the file, such as "Proof," "Final," or "Mary's." By default, all images are unranked, but when you rank a photo, you can then use that rank to sort your work. This ability makes it easy to distribute work and keep track of what's being done with shared files.

Preview

Depending on the size that you make the Tree view and the Metadata pane, you have a large space or a small space for the Preview pane. The small thumbnail that you selected is enlarged to fill this large Thumbnail pane. This is really a great tool to check images before opening them so you don't open something by mistake.

Metadata

The last pane is the Metadata pane. As described previously, information about the image, photographer's credits, bit depth, and camera data fills this pane. You can view it in two ways: All or EXIF. EXIF displays the data taken from your digital camera, which is now embedded in your document in such a way (XMF) that you can see it.

Healing Brush

A long-standing joke among digital photo retouchers goes like this: If you can't afford the surgery, touch up the X-rays in Photoshop. Well, Adobe has graduated from radiology to plastic surgery with the Healing Brush available in Photoshop 7. For years, you've been able to meticulously use the Clone Stamp tool in order to take out blemishes, wrinkles, and other artifacts that you consider a detriment to your perfect image. If you're one of the lucky who have mastered the art of the Stamp tool, you'll really appreciate what the Healing Brush can do. Not only does it take a sample part of any open image and paints over your live image, it also preserves shading, lighting, and texture in a way that you have to see to believe. You hold down the Opt/Alt key and click an area of the cheek to get the sample image. You then drag the mouse over wrinkles, moles, warts, scars, and even loose hair. All these blemishes seamlessly disappear! This tool is going to be responsible for some very deceptive portraits. From now on, you'll be hearing "How do these people get so old and stay so young-looking?" Figure 13-2 shows an example of just how easy it is to be young again.

Figure 13-2: The Healing Brush removed all the wrinkles around the left eye but retained the correct skin texture and shading.

Patch Tool

The Patch tool resides in the Toolbox with the Healing Brush. With such a neighbor, you may think that the tools are related, and they are. The Healing Brush uses a brush metaphor to paint elements away, but the Patch tool works by moving selected areas within the image. You have two choices to make as you work: the area you want to change, called the *destination,* and the area that you will use to create the change, called the *source.* The Patch cursor acts the same as the Lasso tool—with the difference that it can't go into the "rubber band" selection mode (Polygonal Lasso)—you simply drag the cursor around an area of your image. Holding down the Shift key allows you to add to the selection, and Alt/Option lets you remove areas from the selected area.

It doesn't matter whether you select the source or destination area first because after you make the selection, you click either the Source or Destination button in the Menu bar. Then you place the cursor inside the selection and click and drag the selection to a part of the image that will change or be the source of the change. In other words, if you make a destination selection (an area you want to change), you then drag the selection to an area of the image that will be the source (contains the correct information). A soft, feathering meld occurs, with no visible lines or breaks in color, contrast, or shape.

I suggest that you are cautious about one action when using the Patch tool. The Patch tool creates the seamless image integration by collecting pixels from adjacent areas of the selection. This causes a very slightly blurry border (about 10 to 15 pixels wide) to appear around the selection. If you're working with areas of similar color or contrast, the border is negligible. However, if an abrupt change exists in the shot,

such as the sky meeting a roof, the roof's color blends into the sky more or less as if you applied a motion blur to the edge of the roof. I suggest that you make the Patch do its work a distance away from these areas of abrupt change and switch to the Stamp tool for the final cleanup.

Paint Tools

The new painting engine in Photoshop 7 greatly enhances what you can do with images. The new features probably won't put procreate Painter out of business, but they certainly give you the opportunities to add painterly effects with many different styles of brushes. You can simulate various traditional painting techniques and even invent some of your own.

You can dock the Brushes palette in the Palette Well to have it available at all times. When you select the palette, your screen nearly fills with the window filled with brushes and options. Click on the *name* of a brush (not the checkbox), and the panel on the right changes to an array of options that are available for the brush that you selected. By moving sliders or by inputting numerical values, you can create your own brush in seconds. Then you can save it to the Brushes menu for later use.

The image shown in Figure 13-3 shows a photo of flowers on the left. On the right is the result of about 15 minutes of painting with various sizes and styles of brushes and textures. Doing a "painting" like this with a mouse or a trackball may be a bit tedious, but my Wacom Intuos2 tablet made the task a lot of quick and tactile fun. You can set your brushes to take full advantage of pressure and sensitivity, tilt, and airbrush thumbwheel so that it feels more like you're actually painting the image. By combining two different brushes, the number of painterly effects that you can create are only limited by your imagination. Just as in Painter, you can adjust shape, tilt, scatter, jitter, spacing, texture, diameter, and other attributes of each brush you use. You can even scan your own backgrounds and add them to the Texture menu in the palette for use with any brush.

Figure 13-3: An example of the new painting tools effects in Photoshop 7

Automatically Correct Color

For quite some time, you've been able to adjust the contrast and levels of your images with Photoshop. Photoshop 7, however, adds Auto Color to the Image menu. Auto Contrast and Auto Levels use specific algorithms to adjust your image. Specifically, Auto Contrast uses the Enhance Monochromatic Contrast algorithm (found in the Options section of the Levels or Curves dialog box). It makes highlights lighter and shadow areas darker while preserving the overall color relationship. This option also clips all channels identically. On the other hand, Auto Levels maximizes the tonal range in each channel to produce a more drastic correction in the Enhance Per Channel Contrast algorithm. Because each channel is adjusted separately, you may cause a colorcast — so be warned. The new Auto Color uses the Find Dark & Light Colors algorithm to search for the lightest and darkest pixels in your image and uses those pixels to maximize contrast while minimizing clipping. Auto Color also uses the Snap Neutral Midtones algorithm to find the average, nearly neutral color in your image, and then adjusts the gamma values to make the color neutral.

If you want to create your own personal set of "auto" adjustments, you can do it easily by opening the Levels or Curves panels and then clicking on the Options button. The Auto Color Correction Options dialog box opens (as shown in Figure 13-4) and allows you to modify the default color corrections that Photoshop makes through the Image ➪ Auto Color selection. The Auto Color Correction Options dialog box allows you to change the algorithm, add or release the Snap Neutral Midtones option, and change the amount of clipping in the shadows and highlights. The norm is between 0.05% and 1% for either value. Click on the Save As Defaults box to set your preference of Auto Color Correction as the default that will be used when you choose Auto Color (or Auto Levels or Auto Contrast if you have changed these settings) from the Image menu.
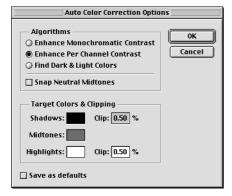
Figure 13-4: The Auto Color Correction Options dialog box

Customize Your Toolset

When you click on a tool in Photoshop 7, the Tool Options bar appears at the top of your window. The contents of this area change according to the tool that is in use. This bar was introduced in Photoshop 6, but now has more powerful attributes. When you click on a tool, such as the Brush or Clone Stamp, you see the following options, as shown in Figure 13-5:

✦ **Current tool:** The currently selected tool appears in the box on the far left. Click on the arrow to see all of your tool presets. Photoshop provides about a dozen styles, and you can add more easily.

✦ **Brush size:** Brush size is in the next box; the arrow brings down the various sizes and shapes you can find in the Brushes panel.

✦ **Mode:** The Mode menu allows you to decide how the tool affects the image.

✦ **Opacity:** Opacity determines how much of the tool's work shows over the underlying image.

✦ **Flow:** Flow relates to how quickly the brush tool applies paint.

Figure 13-5: The Tool Options bar at the top of your Photoshop window

If you often use a combination of brush effects such as angle, size, and opacity, you can save it: Click on the triangle next to the currently selected tool (top left box in the Tool Options bar), and then click on the drop-down menu button and select New Tool Preset. You are given the option to retain the name that Photoshop has given your brush, or you can give it a name of your own. You can even set specific brush presets for cropping information, such as 35 pixels wide by 35 pixels tall at 72 dpi. You may not need this particular cropping information immediately, but during the construction of a Web site, you may need it frequently. This feature can speed up and optimize your workflow tremendously.

Precise Distortions

The phrase "precise distortions" sounds like an oxymoron if ever there was one! However, Photoshop 7 has enhanced the Liquify plug-in module from version 6 so that you can create distortions that are repeatable. Why? Now you can warp a low resolution image, where the computer can utilize RAM most efficiently, and then save the Liquify mesh. Then you can open the high resolution image and apply the saved mesh. You can also save a mesh and return to the image later and do more distortions. You can even resize the meshes to fit any file.

Usually, you see people using the Liquify tool to play with images, creating large noses and squinty eyes. These distortions, however, can actually be used for a real-world reason, as shown in Figure 13-6. You can do all of this in Photoshop by using the standard toolset, but you can also use the Liquify feature to create the distortions much more quickly. When I played with this scenario, I carried out the initial distortions on a 72 dpi file, saved the mesh, and then applied it to the full-resolution 300 dpi file.

Turbulence Tool

The Turbulence tool is a new addition to the Liquify toolbar; it scrambles image pixels according to the parameters that you assign in the brush size, brush pressure, and turbulent jitter input options. As with other tools, such as Pinch and Bloat in the Liquify toolbar, Turbulence creates its effects and lets you view them in a grid view. The grid size is adjustable, and shows the distortion that is taking place in real time.

Figure 13-6 shows the Turbulence tool in action. The original image shows an over-heating part in an engine, which isn't something that you usually get a chance to shoot. Setting up a shot like this can be troublesome — not to mention dangerous — so it's a perfect use for this filter. I added a new layer to the original image, and using a light gray color, I added smoky shapes to it, as shown in the middle image in Figure 13-6. Then with that layer active, I chose Filter ⇨ Liquify and dragged the Turbulence tool through the smoke area. I experimented with brush size, pressure, and turbulent jitter until I achieved the right effect.

Figure 13-6: The effects of the Turbulence tool are equally effective with water or wispy clouds.

Unless you select the Backdrop view and then choose the background image to view, you can't see anything except the smoke and the grid. When you're using light colors for the smoke, as in this image, you don't see much of anything, so it's wise to view

the background. In the final image (shown on the right side of Figure 13-6), I darkened the smoke layer a bit above the light source to make it look more natural. The mesh used in this image is shown in Figure 13-7. I saved the mesh during distortion on a low-resolution image and loaded it into a high-resolution version of the same image.
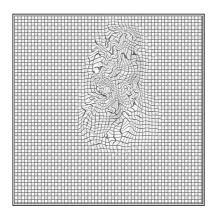
Figure 13-7: The mesh from Figure 13-6

If you haven't used the Liquify feature in the Filters menu, you may not be aware of the existence of the Reconstruct tool, which is similar to an Undo command. Similar in that it doesn't undo the "liquification" that you've done in a reverse order as you're used to, but instead reconstructs in the area where you drag the tool. Basically, it irons out the mesh again as you move the tool around the image.

The Freeze and Thaw tools are equally as important as Liquify. As you may guess, the Freeze tool locks areas of the image that you don't want to be distorted. This tool also creates a red (default) overlay on the image where you want pixels to remain in place. The Thaw tool acts as an eraser on the frozen overlay and opens that area to distortion.

Tip   You can change the color of the mesh and the frozen areas within the View Options section of the Liquify panel. If you have a large area to freeze, it may be easier and quicker to select the parts that you want to liquify, and then click the Invert button in the Freeze Area section of the panel.

New Ways to Create Patterns

Regardless of how often you need to make patterns, it's certainly easier to do now in Photoshop 7 than it was with the old tiling process. Using patterns is now just a matter of making a rectangular section of an image, and choosing Filter ➪ Pattern Maker. A new dialog box appears that allows you to make a few requests from the pattern:

✦ **Tile size:** You can use the entire image size, the size of the selection that you've made, or the default of 128 pixels square as indicated in the Tile Generation panel.

✦ **Offset:** You can ask for a horizontal or vertical offset, or none at all.

✦ **Smoothness:** You can choose from three degrees of Smoothness.

✦ **Sample Detail:** You can enter a Sample Detail amount in pixels.

When you click the Generate button, the preview screen is filled with your new tile. If you're not happy with it, hold down the Opt/Alt key and click the Reset button to bring you back to square one. Make your changes, and try again! Figure 13-8 shows a pattern. The patterns you generate are nothing like the tiles that you're used to. These patterns scramble the image information in such a way that it's barely recognizable — which is what a background pattern should be. The colors remain basically the same, but with repeated generations, you can totally destroy any resemblance to the original image. After you've created and saved a pattern, you can use it with any of the brushes for some really special effects.
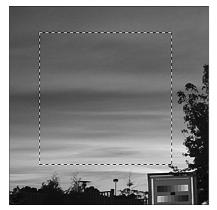
Figure 13-8: The original image, with a selection made for a pattern. The completed pattern is shown on the right.

Create Personal Workspaces

If you work in an environment with two or more artists assigned to the same computer, you probably have a frustrating experience every time you fire up Photoshop. Someone has moved panels and palettes and closed others. You need a few minutes just to get everything in order again so you can work efficiently without searching for your favorite things.

Then again, you may work alone on your computer, but you have to perform different types of tasks. Some days you need to outline objects in photos in order to create clipping paths. On those days, you don't need the Color palette, Info palette, or Styles. At other times, you're retouching color images, or readying them for the Web, in which case you need a different toolset or group of palettes.

Photoshop 7 gives you the option of setting up personal workspaces for each of these scenarios and more. All you need to do is decide that a particular arrangement of panels and palettes is comfortable for a certain type of project. Go to the Window menu, and choose Workspace. Save the workspace with a descriptive name. The next time you sit down to work, go to the Workspace menu and select the arrangement that you want. Within seconds, all the panels and palettes are exactly where you want them. I wish my office were as easy to keep orderly!

Spell Checker

I usually choose to set my text in a page layout program such as Adobe PageMaker, InDesign, QuarkXPress, Macromedia FreeHand, or Adobe Illustrator. You may use Corel products for the same purpose. My philosophy has always been that an image-editing program is for the editing of images, and a word processor should be used for text input. However, Photoshop is attempting to change that. Photoshop has no way to check the accuracy of my typing, which is one of the main reasons why I've never set type in the program. Adobe has removed this reason with the new Check Spelling feature located in the Edit menu. The text doesn't have to be selected. When you select Check Spelling, all layers are checked unless you've deselected Check All Layers in its dialog box. This feature highlights incorrectly spelled words and makes suggestions for replacement words. You can also use the Find and Replace feature, located beneath the Check Spelling item in the menu.

Note Check Spelling compares all the words in your document in the language that you select as the dictionary in the Character panel. A really impressive note is that you can choose from 17 languages, including Canadian French and Brazilian Portuguese. Photoshop isn't likely to give Microsoft Word a run for its money, but at least you can now check your document for errors before committing it to film. Spell checking and the addition of paragraph and character attribute options certainly bumps Photoshop ahead of any photo-editing competitors.

Protect Your Images

You are now able to place a password on Photoshop PDF files in order to prevent them from being printed from Adobe Acrobat. Acrobat users can open the file and view it, but they are then required to input the password in order to print the document. You can save the file with 40-bit or 128-bit RC4 encryption for restricted access.

When you save your document as a Photoshop PDF, you have the option of selecting Security Settings. You are then asked to enter a password needed by the user and a second Master Password that is necessary to remove or change permissions and passwords, as shown in Figure 13-9. Then you can choose the level of encryption, and depending on your choice, add more levels of access or access denial. For example, under Changes Allowed, you have the following choices:

✦ None

✦ Only Document Assembly

✦ Only Form Field Fill-in or Signing

✦ Comment Authorizing Form Field Fill-in or Signing

✦ General Editing, Comment and Form Field Authoring

Printing restrictions limit the resolution of the printing or simply deny printing entirely.

Note These restrictions apply to the document *only* when it is opened in Adobe Acrobat. Anyone opening the file in Photoshop can do what they want with it, including changing or printing the image.
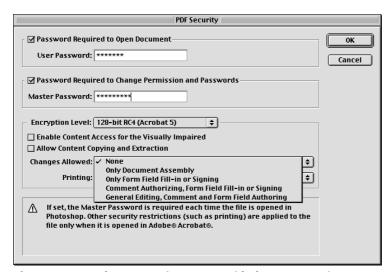
Figure 13-9: Lock your PDF images up with the new security measures available when you save an image in Photoshop PDF format.

Picture Package

If you present package deals to clients, this new feature can save you more time and money than you thought possible! If you have an exceptionally good inkjet printer, you can bring smiles to the whole family with groups of wallet-sized pictures of the kids in no time.

Picture Package is found in the File ➪ Automate menu, and when you choose it, you're greeted with a window-sized panel divided roughly in half, as shown in Figure 13-10. On the left half of the screen, you input information, including the source image(s), the document size, layout, resolution, and label data. The right half of the screen contains a large thumbnail view of the page you are outputting.
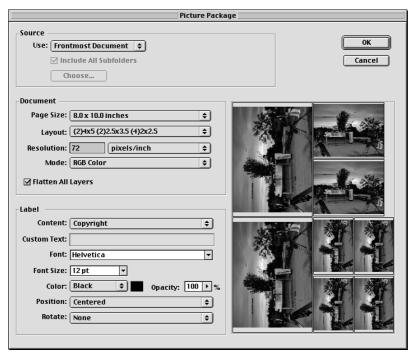
Figure 13-10: The Picture Package can save you hours of mindless resizing and placement.

If you want to print a sheet of multiples of the same image, have the document open and choose Frontmost Document as the source. You can also search for an individual file or choose a folder. I suggest a little planning if you choose a folder, however. Basically, Photoshop runs an action, and the original image opens, is resized, is placed on the page, is opened again, is resized again, is placed again, and so on

until the sheet is full. Each repetition takes a few seconds, and a folder with several images in it may take you through your lunch hour. However, you are spared the time and work of doing it all by hand.

You don't have many restrictions on print sizes either. Figure 13-11 shows all the selections available on an 8 x 10-inch sheet. You can also print to 11 x 17 inches and 10 x 16 inches. You have the option of turning off the flattening of layers on the page as Picture Package is functioning, but you should have a pretty good reason for doing so — each image gets its own layer, and those layers add up to image overhead.
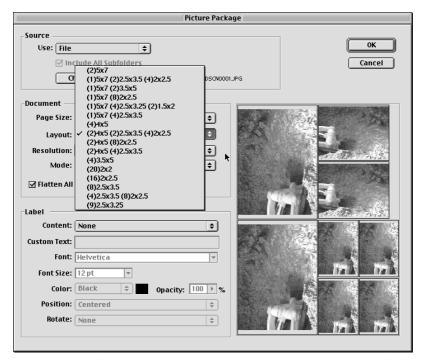
Figure 13-11: The variety of print size arrangements for an 8 x 10-inch sheet

Web Photo Gallery

Similar to the Picture Gallery, the new Web Photo Gallery can save time and energy. It's nothing short of slick! Follow these steps to use this feature:

1. Place images that you want to share online into a folder.

I recommend giving the images descriptive filenames.

2. Select File ⇨ Automate ⇨ Web Photo Gallery.

The Web Photo Gallery dialog box appears, as shown in Figure 13-12.

3. Pick your online layout from the 11 choices in the drop-down Styles menu.

A small thumbnail of your layout appears in the column to the right. Nine of the layouts are static, and two are slide shows that change the large image every ten seconds. All of the layouts are in tables or frames. The static layouts consist of various arrangements of thumbnails. Some are in a line; others fill the entire page. Click on any thumbnail to bring the full-size image onto the screen, and use the Next and Back arrows to navigate through your gallery. Layouts with frames have automatic scroll bars that appear or disappear as required by the number of thumbnails or the size of your large photos.
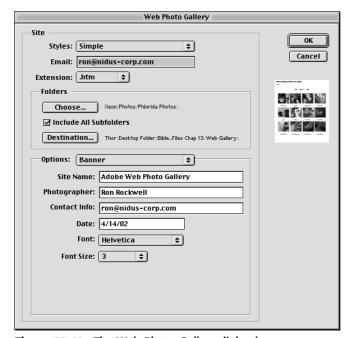
Figure 13-12: The Web Photo Gallery dialog box

4. Enter an e-mail address, and choose whether to have an extension of `.htm` or `.html`.

5. Choose the folder containing your images and create a destination folder.

6. In the Options section beneath the Destination button, select features that you'd like for the gallery.

The Options section of the Web Photo Gallery dialog box determines how the top of your Web page looks. You have the option of creating a size for your

thumbnails and their arrangement on the page. You can also set the size of the large images and choose custom colors for the background, the banner, links, and text.

7. Enter a name for the site, your own information, the date, and the size of the text that you just input that will appear in the banner.

8. Click OK.

Sit back for a few seconds or minutes, depending on how many files you have to process. Your browser pops open with your own personal gallery on it, like the one shown in Figure 13-13.
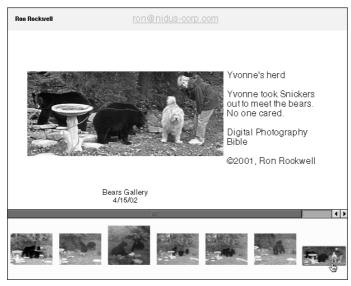
Figure 13-13: One of the 11 layouts available in the Web Photo Gallery

You are then prompted to place the gallery in a folder. It's a good idea to create a new folder for the gallery because this process generates several components of the gallery:

✦ A home page for your gallery named `index.htm` (or `index.html`, depending on the preferences you've chosen). If the gallery is the only file going onto a CD, you don't have to worry about this file's name, but if you're going to place the gallery on the Web, you need to give this file a new name. Otherwise, it may be the new home page to your site — without navigation devices to get to the rest of your site.

✦ A folder named Images that contains the full-sized JPEG files.

✦ A folder named Thumbnails containing the smaller thumbnail JPEG thumbnails.

✦ The Pages folder, which contains HTML pages (this is the last folder that you upload).

Be sure to optimize the full-size images for online viewing, including the sharpening of the photo. As you work with your images, go to File ➪ File Info, and input all the metadata that you want to travel with your pictures, as shown in Figure 13-14. You can place a title, photographer (titled author in the dialog box), the caption, job title, any copyright information, and your URL. If you don't fill this panel out, the gallery only contains the information that you see in the Browse window — filename, copyright if any, and not much more.
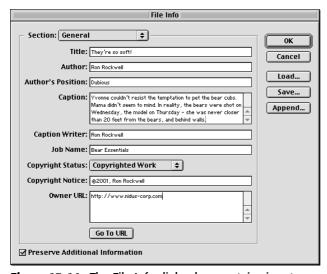
Figure 13-14: The File Info dialog box contains input fields for all your metadata.

You may not *love* the gallery layouts, but it sure beats creating a gallery from code or even a program such as Adobe GoLive, Macromedia Dreamweaver, or Microsoft FrontPage. I imagine that it's only a matter of time before you can download dozens of third-party shareware layouts. In fact, if you're so inclined, you can go to the Photoshop 7 folder, open the Presets folder and the WebContactSheet folder inside, where you'll find the raw HTML pages that you can rework to your heart's content. But do so at your own risk; I recommend working on a copy of the Photoshop file just in case things head south on you.

ImageReady

You're probably aware that Photoshop comes bundled with ImageReady, and that you can use ImageReady to optimize images for the Web. Adobe has pushed the envelope further in this version of the program. By the way, ImageReady skipped a few version numbers and is now at 7 to keep current with Photoshop.

ImageReady has been made more user-friendly, with increased accuracy at analyzing what you will lose in image quality to save on file size before converting your file to a format fit for the Web. Large strides in transparency effects have been also made in the Save For Web command. You can select three variations of Transparency and Matte options in order to have your image blend into the background color of your choice. If you want to have fully transparent pixels stay transparent, while partially transparent pixels are blended with a background color, then you should select Transparency and choose a matte color. You can see the results of the various transparent options in Figure 13-15. This figure starts with the original image of the faucet isolated on a transparent layer that has a drop shadow applied to it.

Figure 13-15: Transparency examples, from left to right: The original image; Transparency selected with matte color; Transparency selected without a matte color; and Transparency deselected with a matte color.

The transparency concept in Photoshop — as it concerns the Web — is that the image is silhouetted from its background. Removing the background leaves a pixelated edge or halo that appears artificial and amateurish when the image is ultimately placed into a Web page. This is readily apparent when the Web page's background is a different color than the background of the original image. You can use the Transparency and Matte options in the Save For Web command to eliminate the halo. For the best melding of the image to the background, don't place the image on a multi-colored base, and choose the matte color carefully. If you're unsure of the color combinations, create a new document with your Web page's background color, and try various matte and transparency dither combinations on it.

Choose the matte color that matches the background of the Web page by clicking on the drop-down menu and selecting from the following:

✦ **None:** No color is introduced into the image. This can be useful if the graphic will be going across a multi-colored background, but jaggies may be visible.

✦ **Black:** Transitional or edge pixels are converted to black. This should be used for black backgrounds and is unsightly when the image is placed on a light background.

✦ **White:** Transitional or edge pixels are converted to white. This should be used with white backgrounds and gives unsatisfactory results on dark backgrounds.

✦ **Eyedropper Color:** To select an Eyedropper Color, you first select the Eyedropper tool, and then click on the color you want to be the matte color. Then select Eyedropper Color from the Matte menu. The transitional pixels become the selected Eyedropper Color.

✦ **Other:** If you select Other, you get the Adobe Color Picker, and you can choose any color you want.

The second transparency option is that you may want all pixels that are more than 50 percent transparent to be completely transparent, and any pixels less than 50 percent transparent to be opaque instead of transparent. If this is the case, check the Transparency box, and choose None from the Matte menu.

The third option is to make all the transparent colors a selected color (the matte color) and *blend* partially transparent pixels with the matte color. To get this effect, deselect Transparency, and select a matte color.

Dithered Transparency

Dithering scatters pixels in an image as a means to show colors that your browser or monitor is not capable of producing. This section deals with the effects of the various dithering options available in Photoshop and ImageReady. You can choose to have no dithering at all if you want, but you can now choose from three different means of creating a seamless integration of your image into a Web page or graphic:

✦ **Diffusion Transparency Dither:** The Diffusion Transparency Dither uses a random pattern of dots across adjacent pixels and creates a significantly less noticeable effect than Pattern dithering. Seams created by this type of dithering are visible where contiguous pixels become solid or transparent. If you choose Diffusion Transparency Dither, you can control the amount of dithering by adjusting the Dither value in the adjustment panel.

✦ **Pattern Transparency Dither:** Pattern Transparency Dither creates a halftone-like appearance to the dither. Figure 13-16 shows how relatively predictable the pattern is.

✦ **Noise Transparency Dither:** This type of dither uses the same type of algorithm as Diffusion but doesn't use adjacent pixels. This means that you don't get any form of a pattern at all. Figure 13-16 is the same faucet image as the previous figure, but in an extreme close-up view so you can see the dither patterns. No matte color is selected for this figure.
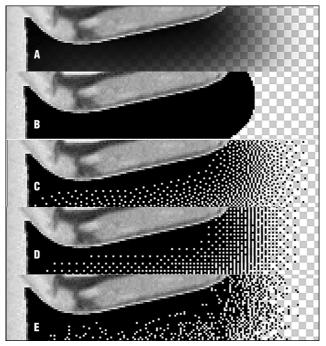
Figure 13-16: The effects of Transparency Dithering with no matte color chosen. From top to bottom: the original image, no transparency, Diffusion Dithering, Pattern Dithering, and Noise Dithering.

Figure 13-17 shows the results of how the dithering works when you have a matte color in use. Notice that in the dither patterns, the dots get progressively lighter until they reach the matte color at the outer boundary of the shadow. All of these dithering options work. You decide which one to use in a given situation.
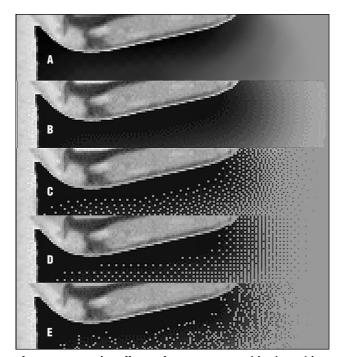
Figure 13-17: The effects of Transparency Dithering with a matte color chosen. From top to bottom: the original, no transparency, Diffusion Dithering, Pattern Dithering, and Noise Dithering.

Weighted Optimization

You may find weighted optimization useful if you work on the Web and occasionally want text or vector art included in an image. Photoshop 7 allows you to use masks to modify JPEG quality so that you can have both clear, sharp areas and softer portions of the image in one piece of art.

In other words, the text or shape layer (the name Adobe gave to vector paths on their own layers) can remain crisp at high resolution while the rest of the continuous tone image can be output at a lower resolution in order to cut down the file size. It works like this:

1. **Create text, or use a drawing or Custom Shape tool (from a library of dozens of shapes) to make a selection.**

2. **Turn the selection into an alpha channel (described later in this chapter).**

3. **Choose File ➪ Save For Web.**

   The Save For Web dialog box opens.

4. Change the file type to JPEG.

5. Click the icon to the right of the Quality field, as shown in Figure 13-18.
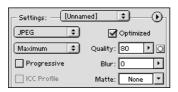
Figure 13-18: The JPEG optimization controls

Figure 13-19 shows the mechanics of weighted optimization in the Modify Quality Setting dialog box. In the figure, All Text Layers and All Vector Shape Layers have been chosen. You can select individual channels from the drop-down Channel menu.

6. Move the white slider to the right to increase the quality (and file size) of the white areas in the Preview window.

7. Move the black slider to adjust the quality of the black areas of the Preview.

In this manner, you can have a very low setting for parts of an image, and extremely high quality in other areas, where it counts.
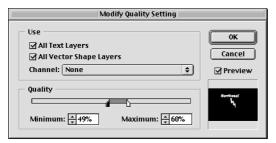
Figure 13-19: The Modify Quality Setting dialog box. Areas in black yield the lowest quality image, and white areas are higher in quality.

To understand how the settings can be utilized, see Figure 13-20, which shows the original image on the left. The middle image has a setting of 80 for the text and the lightning bolt but a setting of only 40 for the background image. The example on the right has had a blur applied to both the text and the lightning bolt, and only the text has been kept at a high quality setting. The rest of the image, including the lightning bolt, have a setting of only 10, resulting in a slightly smaller file size.

Figure 13-20: An original image (left), the same image with text and lightning bolt optimized and the image itself reduced in quality (center), and only the text layer optimized, leaving the rest of the image at a much lower quality (right).

Isolating Edits with Masks and Selections

You can use at least a dozen tools within Photoshop to create a selection of one kind or another. At this point in the chapter, however, I ignore the geometric and more common selection methods, such as the rectangle, rounded rectangle, oval, and custom shape tools. Instead, I concentrate on making selections the old-fashioned way with lassos and pens and magic wands.

When it comes to masking, it's all about contrast. In order to make a selection of any kind, you must be able to determine an edge, and to do that, you need contrast. Photoshop needs contrast, too, but instead of seeing shapes, lines, and colors, the program only sees individual pixels and the adjacent pixels.

When you choose the Magic Wand to make a selection, you must choose the tolerance level that it will use when determining which pixels to select. The tolerance range is from 0 to 255. If you're working in a grayscale image, the default tolerance of 32 means that the Magic Wand will select all the contiguous pixels that are 32 levels lighter and 32 levels darker than the pixel that you clicked. By *contiguous,* I mean that the pixels must be touching each other at least on one edge. A single pixel that is just one level out of the tolerance that you set is isolated from the selection. So if you click a pixel with a value of 165 in the grayscale image, every pixel from 133 to 187 is selected, just as long as it's touching another pixel that has been selected. The group of pixels that have a value of 132 is ignored by the selection. In order to collect this group, simply click the wand on it. Keep in mind, though, that if these pixels aren't an island and are an intrusion from the outside (or inside), you are selecting all the contiguous pixels in the range from 100 through 164. Hold down the Shift key to add to your selection. (Use the Opt/Alt key to remove areas from the live selection.)

If you examine Figure 13-21, you can see how the Magic Wand has done its job. This is a Kodak grayscale ramp with 25 steps from white to black. I used the Burn tool on the light end of the scale to darken an area in the 20 percent range, and I used the Dodge tool to lighten an area around 75 percent. I gave the Magic Wand a tolerance of 12 and clicked just to the right of each of the two modified areas.

This example shows that on the light end, the Magic Wand selected three sections — each section represents approximately a change of 4 percent from the section on

either side. The selection wraps completely around the darkened area, and loses a little of the right edge of the last section. When I clicked the Magic Wand—with the same tolerance setting—just to the right of the light spot on the dark end of the scale, the selection grew to three full sections and half of a fourth. When I viewed this half-section selection at an extreme zoom, I was able to see a slight reflection or shadow that was picked up during the scan. The difference is very small, but it only had to be one value different to stop the selection.
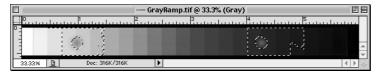
Figure 13-21: The Magic Wand with a tolerance setting of 12 selected everything 12 steps lighter or 12 steps darker than the pixel it clicked. The Magic Wand was clicked at the left side, and then Shift-clicked on the right side.

Working in color is three times as complicated with the Magic Wand because it selects the tolerance in each of the RGB channels of the image. As a result, you can make your Magic Wand selection in one of the RGB channels instead of the color image itself (a good shortcut to remember). You make the selection in a grayscale environment where life is a third as complex since there's only one channel.

To get a clearer understanding of how this works, look at Figure 13-22. Both sides of the image started as a circular rainbow (found in the Brush presets). The left side of the image is in RGB; the right is the green channel. I set the Magic Wand to a tolerance of 12 and clicked at the intersection of the guidelines at the top of the rainbows. The RGB image only received a few pixels in its selection, but the green channel got a huge swath of pixels. If you make this particular selection in order to gather only the pixels that lie between yellow and green, you should go with the color image and make many tiny selections. If you want a general color area, you're better off going with a single channel to make your selection.
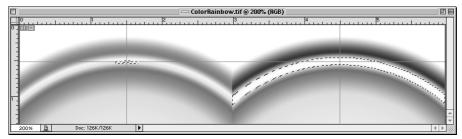
Figure 13-22: I clicked the Magic Wand at the intersections of the guidelines on the color image on the left and the green channel image on the right. Notice the difference in the amount of pixels that were selected.

The Magic Wand works by selecting contiguous pixels within a tonal range, and it's great for selecting broad areas such as sky or fairly even-toned backgrounds. Even in this case, however, isolated groups of pixels won't make the cut, but you want them to be in the selection, anyway. You can handle this situation in one of three ways:

✦ **You can click the Magic Wand within the island of unselected pixels.** This way, you don't have to change tools or travel to the menu.

✦ **You can switch to the Lasso tool and run a quick selection around those tiny areas that the Magic Wand missed.**

✦ **You can choose Select ➪ Similar.** With this command, the entire range of pixels that you indicated are selected throughout the image. This range may only include a few errant pixels, but you may also pick up areas of the image that you don't want selected. For example, suppose that you are selecting an evenly toned sky with winter trees in it. Clicking the Magic Wand in the sky area selects all the contiguous pixels of sky, but stops around the outline of the trees. To get the sky within the tree branches, the Select ➪ Similar command is the easiest way to do so. However, this command may also pick up reflections in a window or on a sign, in which case, you must deselect these spots. At this point, you can switch back to the Magic Wand and hold down Opt/Alt to remove these areas from the selection, or you can use the Lasso tools to remove them. It's always a toss-up as to which tool to use in a given situation.

Generally, you don't use just one tool to make a selection. Instead, you use two, three, or four tools in order to claim specific areas for modification. In fact, many times it's much easier to select what you *don't* want rather than what you want. For example, suppose that your object has a complicated outline, such as a flower arrangement on a walnut table in a room with dark walls. Selecting the flowers by using the Magic Wand will take a lot of time and will probably be pretty frustrating. However, two or three clicks of the Magic Wand in the background area and on the table will almost make your selection complete. Then choose Select ➪ Inverse, and you're ready to work on the flowers.

The Lasso tools

The Lasso is comprised of three powerful tools. Click on the Lasso icon in the toolbar and hold the mouse down. A fly-out menu appears, shown in Figure 13-23, giving you the option of choosing any of the Lasso tools. Click the "L" to switch to the Lasso Tool from whatever tool you're presently using. Then, hold down the Shift key and type **L** to toggle through the various Lassos. You can pre-select a feathering limit in the Options panel, or you can leave your path unfeathered. (After you make any selection with any tool, you can add feathering through the Select menu.)

If you don't have the entire image in the window, the window scrolls when you move the Lasso to the window edge. This feature can be a little disconcerting if you're in the regular Lasso tool because it draws a path as the window scrolls. I've muttered

several epithets and hollered on many occasions because of this feature. The workaround is to hold down the spacebar, which turns the cursor into the grabber hand, and you can then move the contents of your window around without adding an extraneous path. Keep the mouse down, though. If you release the mouse to use the grabber hand, you will close the path that you started.

Figure 13-23: The Lasso tool selection in the toolbar. The black square indicates the current tool selection.

Standard Lasso tool

You use the basic Lasso to drag a freehand path around an object or area. As soon as you start dragging the Lasso tool, a path appears showing where you've been. As soon as you release the mouse, the path closes with a straight line between your starting point and where the mouse was released. If you make a U- or C-shape around your object, then you get the selection that you expect. However, if you make an S-shape, the connecting path leaves you with two semi-circles, which is probably not what you expect. If you're attempting to select an S-shaped area, you must continue around until the Lasso can close without cutting off parts of the selection.

But, wait! You can get around this frustration by simply holding down the Opt/Alt key. If you're in the Standard Lasso tool, the lasso becomes a Polygonal Lasso, and you get the rubber band effect until you release the key. If you are already in the Polygonal Lasso, the Opt/Alt key allows you to drag a freeform path. The best part of the key combination is that the path doesn't automatically close on you. Depending on whether you drag or click, the Opt/Alt key causes the Magnetic Lasso tool to draw freeform or straight paths.

Polygonal Lasso tool

This is actually the tool that I prefer to use, along with the Pen tool. With the Polygonal Lasso, you click the mouse and release it. Then you move the mouse to a new location and click it again. A line, aptly called a *rubber band,* connects the last point you placed with the mouse in its current position so you can see exactly where your path will be placed. When you return to the starting point, the icon adds a tiny circle, meaning that the next mouse click will close the path. I like this tool because you can create really long straight paths without multiple clicks. It also doesn't draw a path when the window scrolls. If you have long straight sections, one or two clicks do the job; if you're turning a tight corner, zoom in and click wherever necessary to make the curve correctly. Remember that you get a series of straight lines with the Polygonal Lasso, which implies that if you go around a large curve with just one or two clicks, the curve may look like part of a hexagon when you complete the selection.

Magnetic Lasso tool

In my experience, the Magnetic Lasso tool is one that you will either love or ignore. The Magnetic Lasso works a little like the standard Lasso, with attributes from the Magic Wand. It operates by finding edges or contrast. In addition to feathering, you select three parameters:

✦ **Width:** Width sets the diameter (in pixels) that the tool will search in its determination of contrast. You can use the square bracket keys "[ ]" to enlarge or reduce the width, or if you're using a pressure-sensitive pen, you can click the option to have pen pressure change the diameter. In this mode, the harder you press, the larger the width becomes.

✦ **Edge contrast:** Edge contrast is measured in percentages. This parameter is similar to the Magic Wand, but where the wand selects a range of values of contiguous pixels, edge contrast looks for differences in value according to the range of change between adjacent pixels. A low number creates a tight outline even in areas of little contrast; a high number creates a much looser selection due to the fact that it needs a greater amount of contrast between pixels before it will place the path.

✦ **Frequency:** This works similar to the tab setting in a word processor. The Magnetic Lasso automatically places points along the path as you create it. If you select an image that is fairly straightforward — that is, not complicated — a low number will suffice in the Frequency field. However, if your image is highly detailed, you're better off to place a high number here. This way, points are placed more closely together along the path. The points disappear as soon as your selection is complete. At any time, you may add a point yourself by clicking the mouse. This has the effect of cleaning up areas that the Lasso wants to ignore. If you've gone by a lump or bump in an object and the Lasso gave you a straight path, click the Delete key. Each time you click it, the last remaining point is removed. Use it until you get to the optimal place, and then move along the edge and place your own points where needed.

No matter how often you use the Magnetic Lasso tool, you'll end up using other tools as well — as part of the touch-up process or as a tool of choice. However, this goes for all the selection tools — just as you can't repair an engine with only a Phillips head screwdriver; you need the whole toolbox. The Magnetic Lasso is a great timesaver when used on a selection area that has a great deal of difference in contrast between the object and its background.

The Pen tool

If you want to be more precise in your selecting, then the Pen tool is going to be a favorite. If you've used CorelDRAW, Macromedia FreeHand, or Adobe Illustrator for any length of time, you'll be creating selection paths in Photoshop in no time.

The Pen tool creates vector paths. When you place a point (by clicking the mouse), the program waits for the next point to be placed, and mathematically creates a path between the points. Each point has direction handles within it that may be drawn

out from the point. If you want the next section of the path to be straight, hold down the Opt/Alt key and click the point you just placed. You still have the curve before the point, but the next section will be a straight shot to the next point. The handle effects the direction of the path following or preceding it, depending on which direction the handle is drawn. Figure 13-24 shows points with handles drawn in various states. As you can see, you have many options when it comes to placing vector points and creating curves. Four different artists may give you four different placements of paths and ways to use the handles.
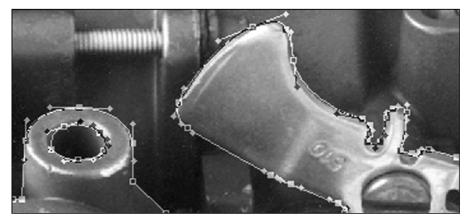
Figure 13-24: Points placed by the Pen tool create a path that can be used as a selection boundary.

So what happens after you've carefully drawn your vector path? First, you can save it in the Paths panel to be used in the future. This includes using the path as a mask for retouching, a clipping path, or as a selection used to make creative layer effects. Second, you can also add or subtract the path (selection) to other selections in your image. Naturally, you can feather the selection or stroke the path, as well.

I like the Pen tool because it makes my lines extremely accurate — right down the straight-aways and around the curves. When I make a vector curve, no bumps or hiccups occur along the way. The path remains smooth and sharp.

The Pen tool has roommates just like the Lasso tool. Figure 13-25 shows the other Pen tools. From top to bottom these tools are as follows:

✦ **The basic Pen Tool:** This tool is used to place points and adjust direction handles as you work.

✦ **The Freeform Pen tool:** This tool draws a path just like the Lasso tool — just click and drag to make the path — except when you finally release the mouse, you don't get a selection, but a path instead. You can continue the path until your selection is complete. At the time your cursor approaches the beginning point of the freeform path, a buttonhole is added to the cursor, letting you know that the path is now closed.

The path has the added benefit of having points placed all on its own. You can then go back and adjust individual point placement or handle adjustment to fit your selection perfectly. You can type **P** to select the Pen tool. Type **P** and hold down the Shift key to toggle between the regular Pen tool and the Freeform Pen tool.

✦ **The Add Anchor Point tool:** If you can't seem to get your path to conform exactly to the shape you need, choose this tool to place a new point in the path. It has all the attributes of the other points on the path, and you don't have to select the path in order to add a point.

At this point, you should understand that when you're working with the Pen tool and you place the cursor over a selected path, the cursor turns into an Add Anchor Point Tool cursor. Click the mouse, and it adds a point to the path.

✦ **Delete Anchor Point tool:** Run the cursor over a point on a selected path, and the cursor turns into a Delete Anchor Point tool. Click the mouse to remove the point from the path along with any effects the point had on the path. Hold down the Cmd/Ctrl key while the Pen tool is live, and the cursor turns into a direct selection arrow, which you can use to move points or adjust direction handles.

✦ **Convert Point tool:** This tool looks like a carat or an arrow that's lost its shaft. The Convert Point tool retracts the direction handles on a curve point — which leaves a straight segment on either side of the point — or allows you to drag out a direction handle from a corner point. The handle comes out on both sides of the point. Use this tool to clean up work you may have done with the Freeform Pen tool.

Take advantage of the following useful shortcuts when using these tools:

✦ Type **P** to access one of the Pen tools.

✦ Hold down the Cmd/Ctrl key to switch the Pen into a selection arrow.

✦ Use the Opt/Alt and click on the last-placed point to retract the curve handles for the next section of the path.

✦ Use Cmd/Ctrl+S to save the document. Use it frequently!
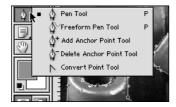
Figure 13-25: The selection of Pen tools available in Photoshop 7

Geometric Selection Tools

The really basic selection tools are as follows:

✦ Rectangular Marquee tool

✦ Elliptical Marquee tool

✦ Single Row Marquee tool

✦ Single Column Marquee tool

The Rectangle selector creates a straight-edged selection by clicking and dragging in a diagonal path from one corner to the opposite corner. When you release the mouse, your rectangular selection becomes active. Click the cursor outside the selection or use Cmd/Ctrl+D to deselect the selection. If the selection is too large or too small, you don't have much of a choice but to redraw it.

A ruler's guidelines are very convenient when you're drawing rectangles and ellipses in Photoshop. From the menu bar, choose View ➪ Rulers. Then click the cursor inside the ruler space and drag the guideline onto the image. The guideline won't print, and you can drag it to another position or off the page by placing the cursor directly over the guideline, then clicking and dragging it. You'll know when you can click and drag when the cursor switches to the guideline cursor — two parallel lines and a triangle. Click and drag before you have that cursor, and you will have moved something in your window.

You should know a few tricks to using the Marquee tools, which are shown in Figure 13-26:

✦ To constrain a rectangle to a perfect square, or an ellipse to a circle, just hold down the Shift key.

✦ If you want to draw a rectangle or ellipse from the center out, instead of from corner to corner, hold down the Opt/Alt key before you make the initial mouse click. This is a very useful trick to use when making an elliptical marquee around a portrait. Just make your first click in the center of the person's forehead or face and drag outward.

✦ When you need to draw a rectangle or ellipse of a specific size, open the Info palette and keep an eye on the "W" and "H" fields that indicate the actual size that you are creating.

✦ Type **M** to get to a Marquee tool.

✦ Press Shift+M to toggle between the Rectangular Marquee tool and the Elliptical Marquee tool.

Figure 13-26: The Rectangular Marquee tool is selected, as indicated by the solid black box to the left of its icon.

You may wonder, "If I'm watching the Info Palette, how can I see where the rectangle or ellipse is being drawn?" This is a good question. The answer is to draw the shape to the desired size and keep the mouse down while you press the spacebar. The spacebar acts as if it were putting the drawing tool on hold; any shape you have drawn prior to pressing the spacebar will be "put on hold" until you release the spacebar again. By moving the mouse, you move the shape on the image instead of changing the shape's size. Release the spacebar to continue making changes to the shape. If you release both the spacebar and the mouse, the shape becomes a live selection right where you want it — and at the correct size!

When you need to draw several geometric shapes at the same size or ratio, you can enter the numbers in the Options bar. Click the Rectangle or Ellipse tool, and then look in the Options bar for the Styles drop-down menu. You have three choices:

✦ **Normal:** This leaves you free to draw any size and shape you want.

✦ **Fixed Aspect Ratio:** This option allows you to enter width and height numbers such as 4 x 5. Then when you drag the tool, you'll have the correct shape, regardless of size or image resolution.

✦ **Fixed Size:** If an absolute size matters, just enter the numbers in the fields. When you click in the image, the shape appears at the correct size, and all you need to do is drag it to the correct position. It can't get much easier.

What if you want to use the geometric selection tools without using the Opt/Alt keys? The Options panel has four selections or buttons (shown in Figure 13-27) that can help you move quickly through a selection process without fumbling for modifier keys:

✦ **New Selection:** The first button is business as usual; the selection tools work as they always have. Each time you click and drag the mouse you get a new selection area. Unless you hold down the Shift key, anything that is already selected will be deselected if you click the mouse. To delete an area from an existing selection, hold down the Opt/Alt key.

✦ **Add To Selection:** When you are in Add To Section mode, you can continually add to your selection by just clicking and dragging in any of the Marquee or Lasso tools. Everything that has been previously selected remains selected without the need for the Shift key.

✦ **Subtract From Selection:** This button works similar to the Add To Selection button, except it removes (rather than adds) areas from existing selections.

✦ **Intersect With Selection:** When you select this option as you draw, only areas that overlap with an existing selection are retained. Everything that "hangs outside" the intersected area is discarded. Holding down the Opt/Alt key plus the Shift key when you're in the New Selection mode allows you to create an intersection selection, but this makes it hard to stir your coffee at the same time.

Figure 13-27: The Elliptical Marquee tool is selected. The buttons to the right are used to assign the same action to the Marquee tool each time you use it.

Figure 13-28 shows the results of using the four modifier buttons with the geometric selection tools. The order of drawing goes from left to right and I used the following steps to achieve the results shown in the figure:

1. I began with an ellipse.
2. I chose the Intersect With Selection button.
3. I drew a rectangular box around the ellipse, cutting off the top and bottom of the ellipse.
4. I clicked the Add To Selection button.
5. I added an ellipse to the bottom and another to the top.
6. I used Subtract From Selection to chop off the top of the large ellipse with a rectangular marquee.
7. Finally, I chose the Ellipse tool to remove an elliptical section from the shape.
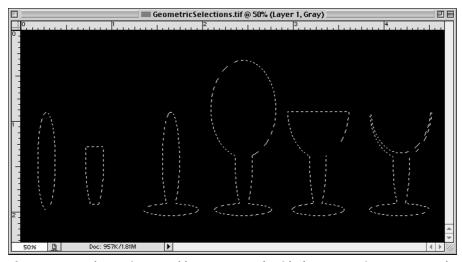
Figure 13-28: The Option panel buttons at work with the geometric Marquee tools

Believe me, I'd never bother to draw a wine glass this way, but the beauty of using these buttons lies in the coordination with the rest of the options that are available. For example, I performed the exercise in Figure 13-28 with the style set to Normal. If you used Fixed Aspect Ratio or Fixed Size, you could do some heavy layout work in a short amount of time. Suppose that you have a catalog page that requires several rectangular images on the page to be 15 picas wide by 18 picas tall, and another page has areas for circular photos. You shot the original photographs with a Hasselblad camera, which yielded square images that you want to use full-frame. All you have to do is select the Marquee tool that you want, make the option to use Fixed Size (15 x 18 picas) or Fixed Aspect Ratio (1:1), and click the Add To Selection button. Then all you have to do is draw the shapes on the page. Each of the rectangles are exactly 15 x 18 picas, and all of the ellipses are exactly circular. (Naturally, if you want to feather the edges, you only need to enter the amount *before* you begin drawing the shapes.)

The Single Row and Single Column Marquee tools are strange animals. I mean, how often do you need to select a single row of pixels? Maybe not so much any more, but just a couple years back, my old scanner would shift a line of pixels now and then. It was nearly impossible to shift them back into place, and I usually resorted to retouching the line. If I'd thought to use the Single Row and Column Marquee tools, I could have saved a lot of time. These tools are also useful for trimming the edges of images and have even been used in video capture retouching.

Editing a Selection with Quick Mask

So far, I have only dealt with the creation of selections, but not cleaning them up. Cleanup with the Pen tool amounts to minor adjustments of directional handles and points. If you chose to stick with the Lasso or Marquee tools, it's a matter of adding or subtracting areas along the selection border. However, there's definitely an easier way to do it.

For those of you who don't remember Amberlith and Rubylith, I'll explain the concept of the Quick Mask mode. This used to be a manual process, beginning with the layout, or it as was sometimes called, a *mechanical* or a *paste-up.* An illustration board was used (for stiffness and durability). This board had the elements that were going to make up a printed piece glued or waxed into their proper positions. The film that would eventually be used to create negatives that were burned onto printing plates was *orthographic*, meaning it didn't see many colors—basically black and shades of dark orange to deep red. When a photo belonged in the layout, you had to cut a sheet of red (or black or orange) self-adhesive film and apply it directly onto the board. When it was shot in the darkroom, the photo area would reproduce as a clear area on the negative—just as the black text. A halftone would be shot of the photograph, and it would be taped over the area left for the photo. The assembled negatives would be exposed to a photographic plate that would eventually end up on the press.

So, when the smart old people at Adobe set about creating the Quick Mask mode, they wanted to use the Rubylith metaphor, and they did a very good job. Here's how it works:

1. **Get your selection as close as you can with the appropriate tools.**

2. **Click on the Quick Mask icon at the bottom of your toolbar, as shown in Figure 13-29.**

   Double-click on the icon to bring up the Quick Mask Options box. In this box, you can have the mask cover the selected areas or the masked areas. Being from the old school, I prefer not to use the default of having the Masked Areas in red, but it's simply a matter of choice; the mask works the same either way.

Figure 13-29: You can enter the Quick Mask mode by clicking the right-most box directly beneath the color well in the toolbar.

3. **Double-click the Quick Mask button in the toolbar.**

   The Quick Mask Options dialog box appears. You can change the color of the mask in this dialog box. If you're working on an image of a fire truck, the red mask may be impossible to see at all. Switching to green or blue helps you get the mask as tight as it can possibly be.

4. **Experiment to find a color and opacity combination that works best for most of the images you work with.**

   Figure 13-30 shows the Quick Mask Options setup as it is on my machine. I have changed the opacity of the mask to 75% (from the default of 50%) so I can see the mask a bit better.
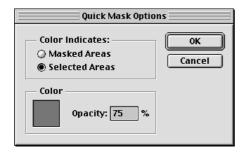
Figure 13-30: The Quick Mask Options dialog box

5. **Click the Quick Mask mode button.**

   This creates a red mask over the area. (The mask may be another color, depending on what you have selected in the Options box). Now you can use any of the painting or editing tools (or filters along edges) to fine-tune your mask.

6. **Use a brush of any style to paint black to add to the mask and white to subtract from the mask.**

   You won't be able to see the white because it's transparent. The flexibility in your choice of brushes means that you can get into tight spots or smooth rough edges on corners.

The mask gets very interesting when you apply less than 100% black or white because you get a feathered edge. This means that you can have a hard edge in one place, and a soft edge in another place, all with the same mask. Then, when you run filters or do whatever adjustments you desire on the masked area, the effect is softer in some places than it is in others. Figure 13-31 shows how the mask works. On the left image, the lenses of the glasses have been selected, and the Quick Mask has been applied. The left lens has a bit of the mask running out onto the frame; the right lens didn't get completely outlined. In the right image, however, a brush has been used with white to paint out the mask on the left lens, and black was painted in the clear areas of the right lens to fill in the mask. Any filters or effects you run on the image will only apply to the masked area — in this case, the lenses.

Figure 13-31: Cleaning up edges is easy with the Quick Mask. Selected Areas is checked in the Quick Mask Options box.

You can't change anything on a locked layer. Therefore, you can't go into the Quick Mask mode if the layer is locked. So if you make a selection, type **Q** to enter the Quick Mask mode. If nothing happens, check out the Layers panel. More than likely, the layer is locked. Double-click the padlock and you're in mask heaven. Another minor frustration lies with the Hide Extras (Cmd/Ctrl+H), Inverse Selection

(Cmd/Ctrl+Shift+I), and Deselect All (Cmd/Ctrl+D) commands. They don't have any effect if you're in a Quick Mask. So if you've set up your mask to cover masked areas, as shown in Figure 13-32 (where any modifications you make to the image will only apply to the masked area around the lenses), you can't just use Inverse Selection to have the lenses selected. You must exit the Quick Mask mode by clicking the Standard mode icon, or by Shift-clicking the Q key.

Figure 13-32: The same mask with the option selected to cover masked areas

It took me a while to get over the notion that the Quick Mask is not a *selection.* I guess if that were the case, it would be called Quick Selection mode. As the name implies, it is a mask. Therefore, it's relatively easy to use a wide airbrush setting and spray a wide feathered edge to the mask, or even use the Gradient tool to create a softening from one side of the image to another.

An example of this softening effect is shown in the next two figures. I started with an image of a carburetor. I selected the background, and inverted the selection so that the carburetor itself is selected. As shown on the left side of Figure 13-33, I employed Quick Mask. (The red overlay accounts for the weakness of the image in the figure.) I then used the Magic Wand to select the *mask,* and then used the Gradient tool to drag a black-to-white gradient from the top right to the bottom left of the mask, as shown in the center. In this figure, the mask was moved to a new layer, and the carburetor layer was hidden so you can see the type of gradient that was used. The photo at the right of Figure 13-33 shows a slight ghosting of the red mask applied to the carburetor. Notice how much more contrast exists on the left side of that carburetor.

Then I deselected the mask (Cmd/Ctrl+D) and applied Filter ➪ Sketch ➪ Charcoal. The result, shown in Figure 13-34, appears as if a photo has been turned into a charcoal drawing or a charcoal sketch has become reality. Any of the filters can be applied to your masks, and the masks can have many different types of gradients, feathered sections of edges, or blurred edges to give you untold special effects.

Figure 13-33: The carburetor in the Quick Mask mode (left), a gradient applied to the mask (center), and the Quick Mask applied to the image (right)
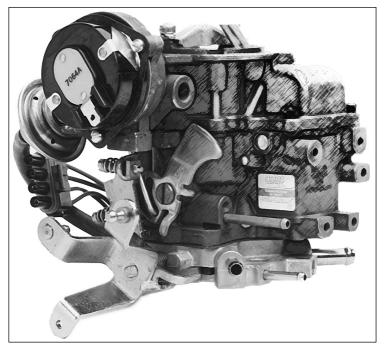
Figure 13-34: A sketch turns into photographic reality, or does a photo turn into an artist's rendering?

Color Range Selections

Suppose that you have an image similar to the one shown on the left in Figure 13-35. You find out that the tulip bulb sales manager that hired you to take the shot just painted the woodwork with red oxide paint and now wants to have the woodwork in the photo modified to resemble his handiwork. You can click on two or three

areas with the Magic Wand, but you'll also pick up lots of artifacts in the ground and even parts of the flowers. It would be almost impossible to attempt to outline the vegetation. So, what's the easiest way to mask the fence?

Figure 13-35: A tough masking job made easy with Color Range

Give Color Range a try. You'll find it in the Select menu, and when it's open, the panel appears, similar to the right side of Figure 13-35. Color Range may seem a bit confusing at first, but after a few minutes, you'll be a pro at it. Similar to the Magic Wand, Color Range works by selecting ranges of color, but instead of selecting contiguous pixels in a color range, this command selects the range throughout the entire image. Besides that, it collects pixels that are partially in the color range. This means that Color Range picks up pixels in the color range that aren't completely saturated, as in a grayscale image — all the pixels use black as their base color, but with 256 shades of black. Whether or not this is your goal, it's a significant factor to remember.

What happens in Color Range? When the panel opens, part of the image is selected, according to the foreground color you have selected. The default has you sample colors throughout the image with the Eyedropper tools. When you click on a color, all areas of that color are immediately selected. By moving the Fuzziness slider, you adjust the sensitivity to the color, similar to the Magic Wand's Tolerance setting. A low Fuzziness setting selects less of the color range, and the further to the right you drag the slider, the more of the entire image you select. If you're comfortable enough, you can enter an amount from 0 to 200 in the Fuzziness field, but the slider gives a more tactile selection for me.

> **Note**
>
> Keep Color Range in mind next time you want to pull a specific RGB or CMYK color out of an image so you can change it. Select that color as your foreground color. Then when you open Color Range, the exact color is already selected wherever it appears in the image.

Fuzziness and multiple selections

As you may guess, you make a tradeoff when adjusting the Fuzziness level or making multiple selections. Figure 13-36 gives an example of how much more information you can pick up by just moving the Fuzziness slider.
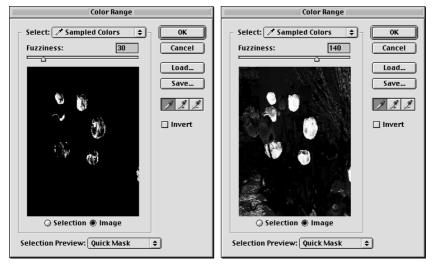
Figure 13-36: A single click on red flowers with a Fuzziness of 30 on the left, and 140 on the right

In Figure 13-37, you see the different selection you get by making multiple selection clicks in the image. Getting the "perfect" selection is a matter of trial and error for each image you work with. By and large, an increase in Fuzziness picks up extraneous pixels in the image, causing you to have more cleanup. Making more selections and keeping the Fuzziness low seems to give a generally better selection for moderately busy images. If the item that you are selecting is quite a bit different in color than the rest of the image, then you can get by with a click or two and a higher Fuzziness setting.

If you need another color in your selection, you can either click on the eyedropper with the plus sign or hold down the Shift key as you click. You can remove colors from the selection by holding down the Opt/Alt key or selecting the eyedropper with the minus sign.
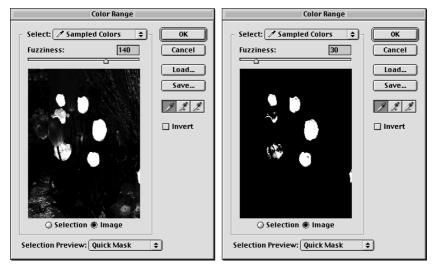
Figure 13-37: Multiple clicks on the red flowers with the same Fuzziness as in Figure 13-36

After you finish making your color selection and click OK, you find yourself looking at your image in the Quick Mask mode. At this point, you are free to clean up the mask with the painting tools or tackle whatever modifications you need to make.

Selection versus Image

Beneath the Preview window are two buttons: Selection and Image. These buttons only control what you see in the preview and give you two different ways to work:

✦ **Selection:** In the Selection view, areas that have been selected are white and the rest of the image is black. This view gives you a good idea where the "gray" areas of your color selection are — which pixels are only partially selected. This view bothers me when I try to work in it because I can't click on a black area of the image and know what I'm clicking for sure. Keep in mind, however, you can click in the main image window itself or in the preview — it makes no difference.

✦ **Image:** The Image view shows the preview image in color, making it pretty easy to choose a particular color or location to click. The Image view never changes, but the Selection view changes according to what is selected. Tap the Cmd/Ctrl key to toggle between the Selection and Image views, which can be very handy when you're making your selections.

Selection preview

As you click the eyedropper on colors, the image in the main window shows the selection in real time in every Selection Preview except None. Other than None, you can choose from the following:

✦ **Grayscale:** Grayscale shows you what your image would look like if you wanted to make this color selection into a channel.

✦ **Black Matte:** Black Matte turns everything that you have *not* selected black. It's as if everything else in the image has been cut out of black paper and placed over the image. This preview is useful when you're selecting a light color.

✦ **White Matte:** White Matte works well when you've chosen a dark group of colors. Those dark colors retain full color visibility in the image, and all of the lighter colors are blasted out to white.

✦ **Quick Mask:** The last preview option is Quick Mask, in which case everything you've selected is changed to the color of your Quick Mask.

The selection that you choose is applied to the image as you add or subtract from your color range.

Using Channels to Blend Selections

Have you ever created a hard-edged selection and then decided that you wanted a soft edge around a shadow area? Photoshop makes it easy to continually modify selections and masks as you work. You can proceed in many ways, and you've found a few tools that you can operate proficiently. Why switch tools? Channels can be intimidating, and it may be that when you look in the Channels panel, all you see is the RGB or CMYK channels that make up your image, and after a look or two, you conclude that they are as boring as you thought they were.

However, it is worthwhile to pass that threshold and familiarize yourself with how to use alpha channels, which are beyond the RGB/CMYK channels. All channels are simple grayscale images lying in the back rooms of the Photoshop studio, waiting for you to invite them out to play. After you see how easy it is to create a channel, and how powerful that channel can be, you'll never work the same again.

Any selection that you make has the opportunity to become a channel. If you work in Photoshop at all frequently, you have worked on a selection that took you more than five minutes to create. You then ran a filter or somehow adjusted the selection and went on about your business. Then it dawned on you that you must reselect that area to make a further change, which takes another five minutes. From now on, if you spend more than a couple minutes on a selection, save it as a channel. Then, at any time in the future, all you have to do is load the channel by choosing Select ➪ Load Selection or Cmd/Ctrl-clicking the channel in the Channels panel, and your

selection is complete. It's really *not* the same as saving the selection as a path. Paths are very one-way — a pixel is either inside or outside the path. With a channel, you have many more options.

You can save a channel in one of two ways. The first option is to Select ➭ Save Selection, which brings up the Save Selection dialog box, as shown in Figure 13-38. The first time you save a selection to a channel in a document, you only have a few options, including saving the selection to this particular document, which will be named in the default Destination menu or opening the drop-down Document menu and select New. Beneath the Document menu, the Channel menu will be New the first time, but the next time you save a selection in this document, all the channels you've created will be in the Channel menu. As a last step in the Save Selection window, you can name the channel, or Photoshop will name it Alpha 1, Alpha 2, and so on.

Figure 13-38: The Save Selection dialog box changes a temporary selection into a permanent channel.

On subsequent channel creations, you can utilize the Operation section of the Save Selection dialog box. The default is to save the selection as a new channel, but you can click the radio buttons to make the selection part of an existing channel, subtract the selection from an existing channel, or create an intersection with an existing channel. These options are the same as the options you have in the Options bar when working with selection tools. Click OK, and the new channel appears in your Channels palette.

The second way to turn a selection into a channel is to make your selection, switch to the Channels palette, and click the Save Selection as Channel icon at the bottom of the palette. That action places your selection in the menu before your mouse is off the icon. It's got a generic Alpha 1 name, so if you want to name it, hold down the Opt/Alt key while you're clicking the icon, and the Save Selection dialog box appears.

If you click the channel in the Channels palette, it becomes active in your document. By *active,* I mean a grayscale mask covers your image completely. At this point, you can alter the shape of the mask by airbrushing soft edges here and there, running various filters on it, or changing its opacity by adjusting Brightness and Contrast. Essentially, though, you're still looking at an opaque grayscale image that can be a totally black-and-white silhouette.

Here's where the magic comes in, however. Instead of just clicking the channel, hold down the Cmd/Ctrl key as you click the channel. Then instead of a grayscale block, you see ants surrounding your selection, and you're ready to make real adjustments to your image.

Keep in mind that saving all these channels may save you a lot of time, but will create a monster of a file when you save it. If you don't need a channel any longer, trash it. Then, when you are finished with all your modifications and alterations, do a Save As and throw away all the channels. They eat up a lot of disk space, and some programs really have trouble even working with a document that has an alpha channel. Just keep in mind that they're no different than layers that you can't see.

This project can help you to get a feel for the power of working with channel masks. For the photo of the Statue of Liberty shown in Figure 13-39, the concept of the stars and stripes seemed appropriate. You create several channel masks using different selection tools and modify the masks using other tools. Open the image `Statue of Liberty.tif` from the CD and perform the following steps to modify the image:

1. **Select the sky with about three clicks through Select ➭ Color Range.**

   Use the eyedropper with the plus sign, and adjust the Fuzziness value if necessary.

2. **Create an alpha channel by opening the Channels palette and clicking the Create New Channel at the bottom of the palette, or choose New Channel from the fly-out menu.**

3. **Name the channel "Liberty," invert the selection, and use it to create a new alpha channel named "Sky."**

Figure 13-39: A run-of-the-mill shot of the Statue of Liberty

4. **Using the Elliptical Marquee tool with a Feather of 24 pixels, draw an oval large enough to encompass the sky, statue, and water.**

5. **Create another alpha channel, and name it "Oval."**

6. **Click the Tool Preset Picker in the Options bar.**

   Select a White 5-point star from about halfway down the list of custom Photoshop brushes.

7. **Press the Q key to go into Quick Mask mode, and then place the cursor just about at Liberty's waist.**

   The star draws out from the center, so you may notice that you placed it a little low or high. If this is the case, hold down the spacebar to drag the star shape around the image without losing shape, orientation, or size. The star will twist on its axis if you drag the mouse freely. Drag the mouse upward and hold down the Shift key to keep the star standing on two points. When it is in the correct position, go back to sizing it. This leaves the star as a red mask, as shown in Figure 13-40.

8. **Press the Q key to go back to Standard mode, and then select the Channels palette.**

   At the bottom of the palette, you will see that the Save Selection as Channel icon has become active. Rest the mouse over the icons for a couple seconds, and the names of the tools will become visible.

9. **Click the Save Selection as Channel icon.**

   This creates a new channel. Hold down Opt/Alt as you click the Channel icon to bring up the New Channel dialog box, where you can name the channel and decide its function — whether it is the selection or a masked area. I gave it the terribly clever name of "Star" and left it as a selection.

10. **Drag several guidelines out in preparation for the wave creation.**

    Place the guidelines at roughly equal intervals across the width of the image and as an upper and lower limit to the wave shape. The guidelines are shown in Figure 13-41.

11. **With the Pen tool, click and drag the curve handle approximately halfway to the first vertical guide.**

    Continue by clicking the second point at the intersection of the top guide and the first vertical guide, again dragging the handle midway to the next guide. Continue across the image until you place the last point and drag its handle out.

12. **Save the path for future reference.**

13. **While in the Path panel, drag the path's icon to the New Path button at the bottom of the panel to duplicate the path.**
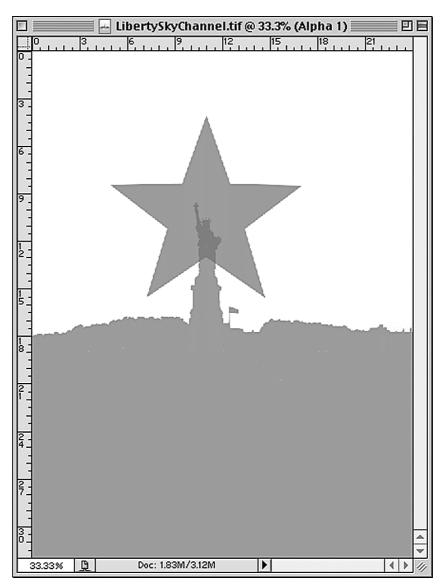
Figure 13-40: The Star mask superimposed over the Sky mask

Figure 13-41: Making waves

14. **Select the path on the image and move it down until the top points align with the bottom line.**

    Then it is an easy task to connect the end points of the paths together to create one closed path. You can then duplicate this path and drag it into a lower position.

15. **Make the paths a selection, by Cmd/Ctrl-clicking the path's name in the Paths panel, and switching to the Quick Mask mode.**

16. **In order to soften the edge of the mask, give it a slight Gaussian Blur.**

    This is similar to an Anti-Alias effect, but the edge is a bit softer.

17. **Use an airbrush with a fairly wide tip to spray along the bottom edge of the top wave.**

    Spray the bottom wave as well. You can see the result in Figure 13-42.

18. **Switch back to Standard mode and click the Add Selection as Channel button.**

    This allows you to keep the hybrid hard-edged/soft-edged waves.

    At this point, the image still looks the same because all you have done is create masks, but it didn't take long to see the changes.

19. **Load the Star channel.**

    By the way, you can either go to the Channels panel and click on the channel you need, or you can type Cmd/Ctrl+"n" (where "n" is the number of the channel). RGB take up 1, 2, and 3; the rest follow in numerical order. Of course you can shift their arrangement in the panel, so you must keep the channel's numbers straight.

    You can tell that the Star channel is selected, because the row of ants are marching around the star.

20. **Choose Select ➪ Load Selection again, but this time select the Sky channel and click the box marked, "Subtract from selection."**

    This action punches the Statue of Liberty out of the star.

21. **Use the same airbrush tool, but with a much smaller brush to go around the knockout of the statue.**

    To produce a soft glow around the statue so it pops out of the star background, use a white brush to go around the statue's outline. (You can see the result in Figure 13-43.) Conversely, you can also just open the Sky channel and use a black brush to go around the statue before subtracting it from the Star channel — same difference.

22. **Switch back to the Standard mode and give the star a dark fill.**

Figure 13-42: The wave's Quick Mask view with the top wave softened already
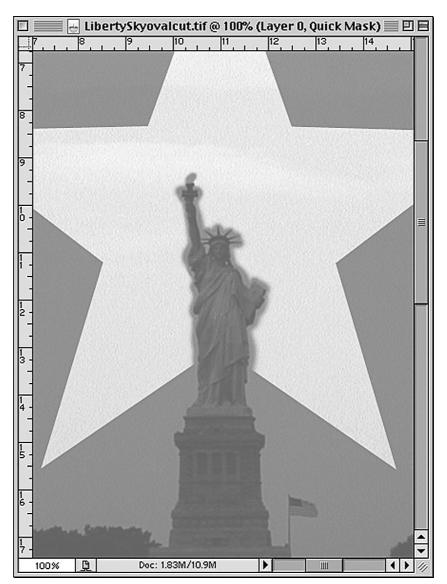
Figure 13-43: A soft glow around the Statue of Liberty sets her off from the star behind her.

23. **Load the oval channel. Then load the softened waves channel with the Subtract Channel from Selection option chosen.**

Hit the Delete key to drop the background out completely. When you switch back to the Quick Mask mode, you can see the way the mask was mapped to the image, as shown in Figure 13-44.
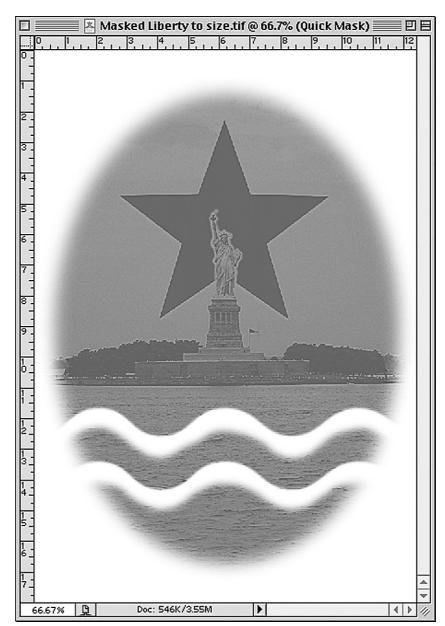
Figure 13-44: The combined masks were used to knock out the background image.

24. For the finishing touches, adjust the Levels and sharpen the image by using nik SharpenerPro.

The final image is shown in Figure 13-45.
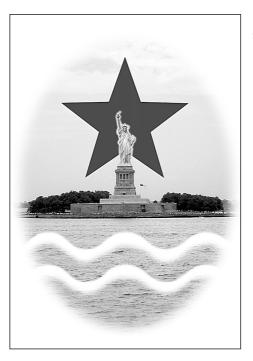
Figure 13-45: The Statue of Liberty, star, and stripes created by multiple masks and feathering techniques

Staying on the Straight and Level

All images, whether they're color or black and white, consist of varying degrees of contrast and tonal differences. You can modify these attributes in many ways in Photoshop, but two of the most efficient ways are in the Levels or Curves commands found under the Image ⇨ Adjustments menu.

An exercise using levels

Open the image `Dog.tif`, shown in Figure 13-46, from the CD. I use this image in the following example to run through a few basics with the Levels and other Photoshop commands. The scan was made from an old contact sheet that had been marked up with a China marker, so start by creating a mask for the background so you can delete the background:

1. **Use the Eyedropper tool to select a middle shade of the background color, and then choose Select ⇨ Color Range to select the entire background and a few stray pixels within the dog.**

   Contrast is good in this image, so it should be a simple matter to use the Fuzziness slider to pick up all of the background and just back off a bit to deselect most of the dog's fur that has been selected.

Figure 13-46: Java's mom was a registered Golden Retriever, and her dad was a registered Black Labrador. Her portrait was taken to test a studio lighting setup.

2. **In Quick Mask mode, use black as the brush color to delete stray pixels from the dog, and other hickeys from the background.**

3. **Give the Quick Mask a Gaussian Blur with a radius of 1.5 pixels, as shown in Figure 13-47.**

   The blur has the same effect as adding a feather to the edge so the background flows more seamlessly into the dog's fur.

4. **Go back to the Standard mode, and while the mask is still selected, delete the background.**

5. **Select light and medium colors as background and foreground colors, and make a gradation from the dog's collar to an upper corner.**

   This highlights the dog without making her stand out too starkly from the background.

6. **While still in Standard mode (with the marching ants turned off), invert the selection by clicking Cmd/Ctrl+Shift+I, which leaves just the dog selected.**

7. **Finally, you arrive at the Levels command: Choose Image ⇨ Adjustments ⇨ Levels, and adjust them, as shown in Figure 13-48.**

Figure 13-47: The slight Gaussian Blur adds a nicer edge to the mask.
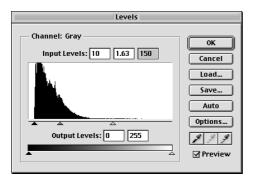
Figure 13-48: The Levels dialog box for the dog project

The Levels dialog box

Although I cover levels in Chapter 11, I also provide a quick explanation of the Levels dialog box in case you've skipped over the other discussions in this book:

✦ **Input Levels:** Located at the top of the Levels dialog box are three fields labeled Input Levels. These numbers correspond to the location/values of the three triangles under the diagram (called a *histogram*) in the middle of the window.

✦ **Histogram:** The histogram is the diagram in the center of the dialog box, and it gives a visual representation of the grayscale channel (in this case), or RGB/CMYK channels in other documents. The histogram indicates the values of gray from solid black (0) to solid white (255).

✦ **Black triangle:** The black triangle on the left indicates the black pixels in the image. Any pixels in the document that are darker than the level you set with the triangle (that is, any pixels that are registered to the left of the triangle), will be solid black. The buck stops there. To see where these pixels are as you're working, hold down the Opt/Alt key as you drag the slider. This action puts the image window into a threshold view, and you can easily see which pixels are being affected.

✦ **White triangle:** On the far right, the white triangle indicates the white point of the image. Anything on the right side of this triangle is void of color — you won't be printing any dots on the paper here. The threshold view can be brought up with the white point triangle, just as the black triangle.

✦ **The gray triangle:** The gray triangle in the center of the histogram is the Gamma slider, which controls the overall brightness of the image. Moving the gray triangle to the left causes the middle gray parts of the image to get progressively lighter, and moving it to the right darkens the gray areas of the photo. The threshold-viewing trick doesn't work with the Gamma slider.

✦ **Eyedroppers:** The three eyedroppers at the bottom of the column on the right are as follows:

   • **Black Point:** Select the Black Point dropper and find an area in your image that you know to be solid black. Here's where a bit of "art" meets "science." If you try to print solid black on an offset press, the dots in the shadow area plug up and fill in and create unsightly dark blotches when the ink hits the paper. To offset this problem, double-click the Black Point eyedropper and enter 4 in the "B" for Brightness in the HSB section of the Color Picker. Now when you click the darkest shadow area, Photoshop gives that area a brightness of 4%, which will leave 4% white dots to show in the shadows.

   • **Gamma:** In working with grayscale images, you don't have the luxury of the Gamma eyedropper, but when you're working in color you do. Click on an area that you know (or want) to be 50% neutral gray. It will remove any colorcasts, based on the color of the pixel(s) that you clicked. It can be quite a shock the first time you click on an area that you think is gray and it turns out to be blue or yellow and the whole image goes psychedelic on you! Just remember Opt/Alt turns the Cancel button into a Reset button, and takes you back to the original, unaltered histogram.

   • **White Point:** You must adjust the white point to compensate for dots that will be blown out by the time they get to the paper. For this, double-click the White Point dropper and enter 96% in the brightness field. This allows you to print a 4% black dot in the highlight areas.

   Be sure not to select a *specular highlight* when choosing the white point. A specular highlight is a bright reflection or glare off of a shiny object — whether that shiny object is a chrome bumper or a bald head. Leaving these areas pure (paper) white is acceptable and even desirable. So go for an area that is very bright, but still contains some amount of detail.

You have a decision to make with the eyedroppers. Photoshop gives you the option of selecting a single pixel, a 3 x 3 pixel average, or a 5 x 5 pixel average. Obviously, a single pixel restricts your range to that one lonely pixel — which may be exactly what you want. The 3 x 3 determines the average color of the nine pixels that make up the 3 x 3 square and uses that as your selection. This may be the way you like to work. Then, you may want a really broad selection base for a particular image, and choose the 5 x 5 for an average color from 25 contiguous pixels. This choice is located in the Options bar, and you must be in the normal Eyedropper tool (from the toolbar) to make the choice from the Sample Size drop-down menu.

How much adjustment is enough?

Enough can be a tough question to answer. Each image is unique, and so are the printing conditions. It is an extremely important part of your job to speak directly to the personnel at the printing plant that is going to output your job. If possible, talk to the people in the pre-press area. They can tell you exactly how large a percentage to leave in the shadow and highlight areas. Some printers want more in one place or less in another; it all depends on their setup and the experience and craftsmanship of the pressmen. Nothing can replace a heart-to-heart talk with these people, and it can save you thousands of dollars. Another way to test out your adjustments is to create an image that can ride along with another of your print jobs. Create a test strip of the job, and make various adjustments on each part of the strip. Then when the job is printed, you can judge for yourself — with the help of the printer — which adjustments work and which don't. It's a simple matter to apply these factors in your future dealings with *that* printer.

Where do you start?

It's a safe bet to start by dragging the Black Point triangle to the right until it just touches the edge of the spikes in the histogram. This "spike" can be one pixel tall in the histogram — it just marks the darkest pixels in your image. Then drag the White Point slider to the left until it hits the right edge of the histogram. At this juncture, you've set the black and white points of the image. Now adjust the gamma. About twelve times out of ten, you will move the slider left, which lightens the image. You have to depend on your eyes here. Move the slider back and forth until the image looks like it has the correct amount of contrast to it. Sometimes, you only move the slider 0.05 or so; other images require 0.6 or more. Figure 13-49 shows the beginnings of the grayscale adjustment I used for the dog selection.

Because we've created the points at which pixels go black and white by using the sliders, we need to compensate for the shadow and highlight dots differently than when we use the eyedroppers. In this case, the Black Output slider was moved to the right until it read about 12, and the White Output slider to the left to about 247.
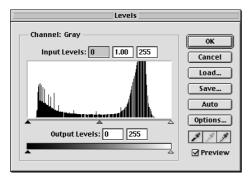
Figure 13-49: Black Point, White Point, and Gamma have been adjusted. All that's left is to slide the Output Levels in on each end.

Curves Ahead!

The Curves command does everything that the Levels command does, only with a lot more freedom and flair. Most new Photoshop users adjust the brightness and contrast of their images in the Levels dialog box. Why shouldn't they work that way? It's easy, the results are immediate, and you don't have an awful lot to learn. Besides that, it seems to work okay.

Curves, on the other hand, have a bit of a learning, er, curve. However, it's not nearly as complicated as it seems. The Curves dialog box is simply a way to adjust the grayscale tonality and contrast of an image, or any of the various channels that make up the image. Any alpha channels that you've added can also be altered in Curves, but they don't show up in the RGB or CMYK Curves menus. In order to operate on your alpha channels, you must select it from the Channels palette. Then you can make your tweaks in Curves just as you would any other channel.

This simple concept allows you to make very broad or extremely narrow changes to make all the difference in the world in your final image. Not only can you change the amounts of RGB or CMYK colors, but you can create masks that are very specific in their content and use. A side effect is all the special effects that you can come up with in Curves. You can do everything from solarization to chrome with a few clicks or drags, and a few minutes of well-spent time.

All Curves windows start out looking the same, except for the name of the channel or channels that you've selected. They consist of a basic square that's divided into four columns and rows, making it pretty easy to see where 25% increments are located on the diagonal curve. You can see the two grayscale ramps running vertically and horizontally, as shown in Figure 13-50. The diagonal line represents the fine line between what is in the image (Input), and what you are going to make it look like (Output). The area above the line is your image data; everything below the line symbolizes your changes. This probably makes little sense, but a straight line means that what you see is what you get.

At the intersection of the diagonal "curve" and the first two grid lines, the curve is measuring pixels in the image that are 25% of solid black. If you click the cursor on that intersection, a black square appears on the line. You can move that point in any direction by clicking and dragging the mouse, or by using the keyboard arrow keys. If you move the point up five keyboard arrow clicks, all the 25% black pixels in the image become 30%. This action causes the curve to bow out of its original straight-line diagonal, and *all* the pixels in the image change accordingly. Well, not all the pixels — the solid white and solid black pixels won't change, and pixels close to them in value won't change as drastically, but they will change.
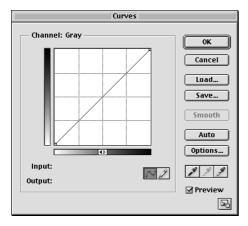
Figure 13-50: The Curves dialog box always starts out looking like this.

The opposite is also true. Click the curve line at the third grid from the left (75%), and give it ten clicks down. Now you've taken all the 75% black dots and dropped their value to 70% (see Figure 13-51). Notice that you can also enter values in the Input and Output fields to achieve the same results. In order to pull this off, though, you need to place another point somewhere on the path. If you don't, the currently selected point moves to the location that you enter. Look where the center of the path lies, however; exactly in the middle, meaning that those values won't change. This curve is called an S-curve, and is a very common adjustment, although the shape changes from one image to another. Take notice as you experiment, and remember that the more vertical you make the face of the curve, the more contrast you create in the image. If you have a point on the curve that doesn't seem to do anything for the image, just drag it to any wall of the grid, and the point disappears, leaving the curve to snap into a shape dictated by the remaining points.

The curve shown in Figure 13-52 is the curve used to create the final image of Java the Mutt. Here, the dog's coat was very dark, and the whites were shifted straight to the right — in effect, the same as moving the white triangle in when using the Levels command. The same thing happens on the other end of the curve as the black point is shifted left. It's a matter of having Preview checked so you can watch the changes that your curve makes on the image as you make minor adjustments.
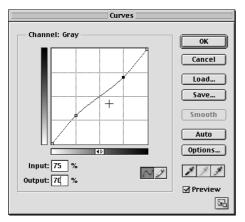
Figure 13-51: The tonal range has been adjusted to darken middle highlights and lighten shadows. Middle values remain basically unaltered.
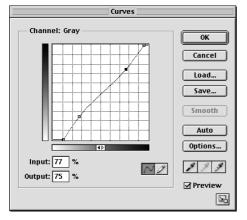
Figure 13-52: This curve clips quite a bit of white and a good amount of black from the image.

What if you want to select a particular area of you image for adjustment? Keep in mind that you can change the Sample Size of the eyedropper, and try these tricks: First, move your Curves panel so you can see as much of your image as possible. Then move the cursor over the part of the image that you want to sample. If you hold down the Shift key and click your sample area, you apply a numbered target to the image. You can have up to four targets on the image at once, and information about these sample points is shown in the Info panel. As you click the mouse, you also see the point show up on the curve in the Curves box. The point only lasts as long as you hold the mouse down, then it's up to your short-term memory to remember where that point was. I guess the people at Adobe thought this was too much work, so they added a keyboard shortcut that's pretty neat. Just hold down the Cmd/Ctrl key as you click your target—whether it's numbered or not. This action places an active dot on the curve. You can use keyboard arrows to move the point, or click it with the cursor and move it around. Better yet, if you look at the Input value and make a decision as to what you want the Output to be, just hit the Tab key twice and the Output field is selected. Type in the number, and you're done!

Okay, I see it, too. An Auto button is right there in front of you. Why not choose it? It yields the same results as clicking Auto Levels in the Image ➪ Adjustment menu, and is probably too drastic or bland for you. Do it the hard way — it will actually take you less time, because you won't have to go back and correct something that the software did.

The other item in the Curves panel that I haven't yet discussed is the Pencil tool. Instead of plotting points with the mouse directly on the curve, you can draw a freehand shape. It's cute, but most artists don't bother with it unless they want to create something otherworldly. Figure 13-53 is an example of a freehand curve and the results on the dog. When drawing curves with the pencil, you'll soon see that the curve doesn't really break — wherever you start or stop a section of your curve, another section of the curve disappears. An invisible vertical cliff exists that the curve travels to the next section. In order to create a plot for a particular color area of your image, click the cursor in the image where you want a sample. A point appears briefly in the grid, marking that level of gray. Make a path toward the top of the grid to get a darkening of that section in the image. Place the path lower and the grays become lighter.
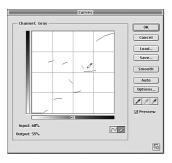
Figure 13-53: The Pencil tool was used to make the curve shown here, causing the posterization of the image.

With just a little practice with Curves, you can soon be comfortable making tonal adjustments in very particular areas of images instead of the global changes you make in the Levels command. You'll find that Curves give you much more control so you can finesse the utmost tone and contrast from your photograph. Best of all, you do this in one environment, and the changes take place in real time — you can see the effects of every nuance you apply to the curve.

If you have a setup that you use frequently—for a catalog, for example—it's a good idea to save the curve just as you would a Levels adjustment. It almost feels like cheating to load that curve, and make extremely minor adjustments. All gain and no pain!

Knockouts

A knockout is nothing but a selection that you use to remove an area from an image. All of the drawing tools and selection tools can create knockouts, but some take more time and patience than others. Consider the grayscale alligator shown in Figure 13-54. Drawing an outline of this beast would take a considerable amount of time, and you wouldn't be able to use tools like the Magic Wand or Color Range to separate the animal from the background.

Figure 13-54: This alligator would eat up a lot of time if you were to outline it by using conventional methods.

Photoshop has just the tool to ease this procedure and minimize your contact with nasty beasts like this. It's called Extract, and it's found in the Filters menu. Extract works a little like the Magnetic Lasso, and a little like the Magic Eraser. The Lasso tool wouldn't work well—if at all—in this image due to the many tonal changes within the alligator and surrounding it. The Magic Eraser just wouldn't know what to keep and what to throw away (naturally, in a color image, it may be easier, but this happens to be a black-and-white photo).

Extract asks you to draw an outline around everything in the image that you want to keep, which you do with a Highlighting brush. Drag the brush around the edge of the object that you are separating from the background, and the tool's operation is not that much different from a regular brush or the Lasso tool. However, instead of a one-pixel path resulting in marching ants, Extract produces a highlighted border that straddles the edge of what you want to keep and what you want to lose.

In order to make the tightest outline, you should use the smallest brush possible. Zooming in on the image helps you to use a small brush and still see what you're doing. If you make a mistake, such as drifting off to sleep and dragging a line through Aunt Marie's face, just click on the Eraser tool and wipe out the offending lines. Then switch back to the Highlighting brush and continue the outline.

You can select the Smart Highlighting option to make highlighting much easier. Clicking on the Smart Highlighting checkbox creates a brush that acts like the Magnetic Lasso in that the tool looks for a contrasting edge for you. It's a very effective tool when the background and foreground have fairly distinct contrasts with each other. Whether you use the regular Highlighting brush or invoke the Smart Highlighting option, you need to clean up the mask later — just like all the other tools in the Photoshop arsenal.

You can choose how smooth to make the edge transition by changing the number in the Extraction ⇨ Smooth field. For most images, it's best to stay with smaller numbers, say from 0 to 4 or 5. Experiment to get the best value for a particular image.

It's a lot easier to do this type of outlining with a digital tablet — I'd be lost without mine. However, one nice attribute of the Extract toolset is that you can make the Highlighter brush act very much like the regular paintbrush or several other tools. Just click a point with the brush, then shift the cursor to another spot on the object's edge and hold down the Shift key as you click the mouse. You get a straight-line path from the first point to the next. Make shorter jumps around corners and longer stretches where you can. The key is to make sure that the highlight overlaps the object and its background.

Figure 13-55 shows the Extract panel as it first opens. The left side of the window contains the minimal toolbox consisting of the following tools:

   ✦ Highlighter tool
   ✦ Fill tool
   ✦ Eraser
   ✦ Eyedropper tool
   ✦ Cleanup tool
   ✦ Edge Touchup tool
   ✦ Zoom tool
   ✦ Grabber hand

After your outline is complete, click on the Fill tool and then click the cursor inside the outline. The outlined object fills with the default color of blue, or whatever color you want to change it to in the Fill drop-down menu. (The highlight color can also be changed if you want.) When you use the Fill tool, only the object should be filled with color. If the whole page turns color, then you have a break in your outline

somewhere. Just deselect the Show Fill box on the Preview panel on the right side of the window and plug the leak. The leak only has to be one pixel wide to cause an image-wide leak.
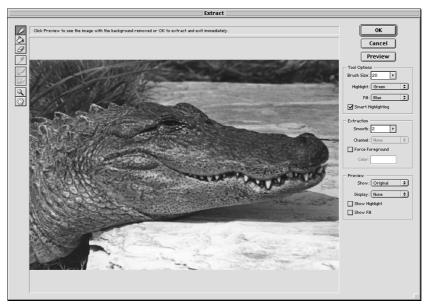
Figure 13-55: The alligator must be removed from grass, the hard slab, and his shadow, which is a perfect job for the Extract filter.

Note Quite often, an object doesn't reside totally within the boundaries of the image. Somewhere along the line, it gets cropped. Extract understands this and saves you a little time by not requiring you to totally surround the object if it hits the edge of the image somewhere. Just run the highlight right up to the edge of the window wherever the object connects with it.

If you want to get a head start on the outlining/highlighting process, you can call on some other selection techniques. The tricks that you use depend on the type of image you have before you. You can make a Magic Wand selection for a good part of the image, or maybe Color Range is in order. After making such a preliminary selection, choose Select ⇨ Modify ⇨ Border, and give the border a width of 6 or 8 pixels. Fill the border selection with black and save it as a channel. When you open Extract, load the channel in the Extraction Channel drop-down menu. Oddly enough, the name in the Channel field changes to Custom — go figure. The border encompasses most of your object for you. Now just erase or add to the outline as necessary.

When the outlining is complete and has been filled, as shown in the left side of Figure 13-56, click on the Preview button. This knocks out the entire background, leaving it transparent, as shown on the right side of Figure 13-56. Now you start the fine-tuning mode of extraction.
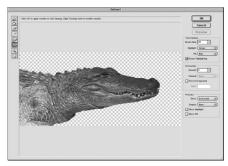
Figure 13-56: An outlined and filled object on the left, and the background knocked out on the right side of the figure

Until you've entered the Preview mode, you won't have access to the Cleanup and Touchup tools. When they appear, you can use them to tidy up the selection:

✦ **Cleanup tool:** This tool works by erasing any pixels to transparency. It works gradually, however, and if you only brush the surface, you erase opacity. The tool has a cumulative effect — the longer you use it in one spot, the more changes occur. Usually, you just use this outside the selection area, close to the border to pick up a stray pixel here and there. The brush is feathered, such as an airbrush, so be careful when you get close to the actual edge of the object or you'll wipe some of it away. Holding down the Opt/Alt key enables you to paint the object or its background back into the selection.

✦ **Touchup tool:** This tool works in a similar fashion, but seems more magical in its operation. As you move the tool over stray pixels *inside* the object, they come back to life. Pixels on the *outside* of the object are deleted. This works up to a point, but eventually simply quits making changes to the image. Then you have to resort to the Eraser tool or the Cleanup tool to add or subtract from the edge. The Touchup tool also works cumulatively and sharpens the edge of your selection.

Use the Cleanup and Touchup tools around the outline. The regular keyboard shortcuts for zooming and moving around the document window work here, so take advantage of them and work at a high magnification so you can check your results. To make this process even easier, you can select different modes of proofing in the Preview ➪ Display drop-down menu:

✦ **None:** This mode leaves you looking at Photoshop's normal transparent checkerboard.

✦ **Black Matte:** This mode places a black layer beneath your knocked-out object, and it is good for checking objects that have a fairly light perimeter.

✦ **White Matte:** This is just the opposite of Black Matte, and is great for dark-edged outlines.

✦ **Gray Matte:** This mode is good for checking a variety of colors and edges.

✦ **Other:** If you click Other, you get the Color Picker, which is useful if you know exactly the color that you are applying to the background of your extraction.

✦ **Mask:** Choose Mask to see a grayscale image of the area that you have extracted. The extraction is white and the background is black.

While in the Preview pane, you can also switch between looking at the original background or just a plain extraction. Depending on the image you have, either one will work for you — it's simply a matter of experience and personal taste.

When you have polished the edge of your selection, click the OK button. You are returned to your original image, where you can either replace the background or use the extraction as a channel or a selection — the world is your oyster. In the case of the alligator, I decided to put it back where it belonged: in New York Harbor. (See Figure 13-57.)
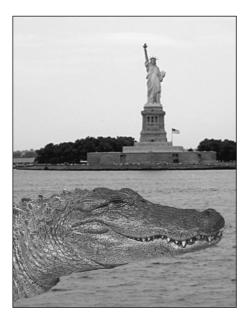
Figure 13-57: The alligator has been extracted and released in the wild.

One further caveat about the Extract command: When you finally have your outline looking the way you want it and click OK, you no longer have a background in your image. So, *always* work on a copy of the original layer, or use Snapshots. For example, you may accidentally delete one of the pointy lumps on the alligator's back in Extract, only to find out ten minutes later that people count those lumps and you've just changed the alligator into a crocodile or something. Without a pristine copy to work from, your only recourse is to do the Extract procedure completely over. Of course, it will take you less time than it did on the first try, but that's not much of a consolation.

Black-and-White Conversions

As a photographer, you realize that when you're shooting in black and white, you have a different mind-set. Everything takes on a different feel, and you just see things differently. You set up your lights slightly differently in the studio, and worry about things that don't even occur to you when you're shooting color. Sometimes you even feel handicapped when you have to go back to shooting color.

Your clients don't understand this, however. They want the job shot once, and they want to be able to use the images on the Web, in a full-color annual report, and as black-and-white prints so they can print them from the office copier. It's not a good situation. However, photographers have to eat, and it's not a great idea to irritate clients by telling them you want to shoot with three different types of film, or that you need to set it up slightly differently to make the shot in black and white. So the job gets done in color and the images are repurposed as necessary down the line.

Note   You're probably aware that your digital camera uses $\frac{1}{3}$ of its software and hardware to produce each of the RGB channels necessary for a color picture. However, a black-and-white setting on your camera dedicates the whole camera to the black-and-white image, netting you a whole lot more information.

Grayscale

You've already shot the photo in RGB, so now what? You can choose Image ⇨ Mode ⇨ Grayscale, and Photoshop gives you a very good representation of your color image. However, with a few other methods, you can get even more from the program. I use the same color image for each of the next four examples. None were tweaked for brightness and contrast using Levels or Curves. Each was sharpened using nik Sharpen Pro, however.

Lab mode and grayscale

The image in Figure 13-58 was scanned in Lab to begin with, and converted directly into Grayscale. They may look slightly different in their printed forms; in the building shape in the lower windowpane, however, you don't see a lot of detail. The lace curtains in the top panes are discernable, but not overly clear. The reflection of the telephone pole in the bottom left pane is dark, but has some details.

Figure 13-58: A color image converted directly to grayscale from Lab

Lab mode and RGB

The next view, shown in Figure 13-59, you can see much more information in the building reflection and telephone pole reflection. The lace in the curtains contains more detail, but the curtain itself is a little darker. This is the result of converting the document from Lab to RGB, then switching to the Channels palette and looking at each of the RGB channels to see which gives the best result. For this image, the red channel gave the most realistic appearance. The blue and green channels were discarded, and the image converted to grayscale. Notice, however, some dark artifacts in the top middle two panes, and the sky area is very dark compared to the "straight" grayscale version. Much detail in the windowsill also fell by the wayside. At this juncture, you probably want to stay with the grayscale version.

Figure 13-59: The same Lab image has been converted to RGB and the green and blue channels have been discarded.

Channel Mixer

Another popular method of creating grayscale images from color is to combine channels through Channel Mixer. The Channel Mixer takes data from existing channels in the document and applies that data to the Output Channel of your choice.

With this procedure, you first change the Lab image to RGB, and then select Image ⇨ Adjustments ⇨ Channel Mixer. You get a dialog box, as shown in Figure 13-60. You should know several tricks here that aren't very apparent:

✦ If you open a color image in Channel Mixer, the Output Channel is representative of either RGB or CMYK. Because you're looking for grayscale at this point, it may be frustrating, but click the Monochrome option in the bottom left corner to change the Output Channel to gray.

✦ You see the Source Channels. One of them is set to 100% — in RGB, it is the red channel, and in CMYK, the cyan channel.

✦ The numbers in the numerical fields must add up to 100% to get an image with all the available data being utilized in the final image. This requires a bit of math, but you can probably do it in your head.

When the sliders in the Channel Mixer dialog box are set in the center, they're basically off — a blank black layer. Moving the slider to the right makes the channel lighter all the way to 200%. When you move the slider to the left, the channel actually inverts and gets brighter — again to 200%. This allows you to subtract data

contained in the source channel from the image. The Constant option adds a brand new channel to the image. If you want to add it to the image, you use positive numbers, making the channel white. Negative numbers create black, subtracting data from the image.
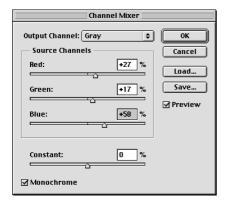
Figure 13-60: The Channel Mixer dialog box used settings that created Figure 13-61, which primarily used the blue channel, with lesser input from the red and green channels.

The photo shown in Figure 13-61 shows the effects of Channel Mixer's efforts. Again, it's tough to say how this will appear in the printed version, but you can see a definite lack of contrast in this particular setup. The image was then converted to grayscale.

Figure 13-61: This photo has been turned to grayscale using the Image ➪ Adjustments ➪ Channel Mixer command.

Lab mode

This last operation uses the Lab mode exclusively. This method seems to hold the most popularity for the professional photographer's image requirements. For me, it's a natural because my scanner outputs scans in Lab, and I don't need to do any conversions. In Figure 13-62, the Channels palette was opened and both the "a" and "b" channels were deleted, leaving the "L" (luminance) channel on its own. Notice the high detail in the upper lace, and that the mesh of the curtains is clear. In the lower panes, the telephone pole reflection has great detail and contrast, and the building reflection also has good detail for a shadow area. The sky in the center panes doesn't have dark artifacts in it, and you can see some detail in the windowsill.

Figure 13-62: The Luminance channel provides excellent grayscale conversions.

Your scanner can more than likely scan in grayscale mode. It may be sufficient for your needs, but you'll probably find that you get better results with more control over the image if you use some of the techniques described here. The bottom line in converting color images to grayscale is still based on what you see in a given image. It is up to you to try these methods to find the best one for any particular situation. Personally, I go with the Lab trick — deleting the "a" and "b" channels, and doing my final brightness and contrast tweaks from there, and finally sharpening the image for the output size.

Channel Operations

Quite often, you end up with an image that is perfect in nearly every way except for film grain or digital noise. This can ruin your whole day, can't it? Then you encounter a situation in which your client insists that you use his files, even though he's fiddled with it and oversaturated the image enough to make it almost unusable. Can you save the day?

You certainly can — in many ways, in fact. You just have to start thinking outside the Levels, Curves, Brightness/Contrast, and Hue/Saturation box. You must get outside the box and into the Lab. That's Lab as in L*a*b color mode.

As described previously, the "L" stands for luminance, and this channel has all the grayscale values contained in the image. In fact, as noted previously in this chapter, you get a very good grayscale conversion just by discarding the "a" and "b" channels and converting the "L" channel to grayscale mode. When viewed by itself, the "a" channel is an ugly, blobby gray mass — much like the inside of my head on Monday morning. But it's really all the information in the image that is comprised of blue and yellow. Light gray equals red, and dark gray equals green. Anything that is 50% gray is white in either channel. To explore Lab space, follow these steps:

1. **Change an image to Lab.**

2. **Go to the Channels palette and select the "a" channel.**

   Leave all the eye icons in the "on" position so that you see the results of all channels combined.

3. **Go to Image ⇨ Adjustments ⇨ Brightness/Contrast.**

   Be sure that Preview is checked.

4. **Move the Brightness slider to the left.**

   Notice that all the green in the image gets much more green, and an overall greenish cast takes over the further left you go.

5. **Shift the Brightness slider to the right.**

   Red becomes dominant.

6. **Move the Contrast slider to the right.**

   Both green and red become stronger.

7. **Move the Contrast slider to the left.**

   This desaturates green and red.

The "b" channel is similar in appearance, but dark (or negative numbers in the Brightness slider) means blue, and light (positive numbers) means yellow. Moving the Contrast in combination with Brightness adjustments creates a milder or stronger color change — the higher the contrast, the stronger the color shift.

Turning off the "L" and "a" channels allows you to view the "b" channel by itself. It looks similar to the emulsion side of a strip of black-and-white film. As you look at the boring grayscale image, notice how little black or white you see in the channel. Choose a good-sized brush and put a black spot in a relatively neutral area (about 50% gray). Then switch colors and place a white spot next to it. Turn the "b" channel off and select or view the "a" channel and do the same thing with the brush. Then click the Lab eye icon in the Channel palette. You see brightly saturated yellow, red, green, and blue spots in the image.

Digital dirt

Okay, now what about putting that knowledge to real-world use? Suppose that you have an image with a lot of noise in it, similar to the one shown in Figure 13-63. This is a digital shot, but it may just as well be film grain lousing up the picture. You can probably imagine other instances where this technique may save the shot.
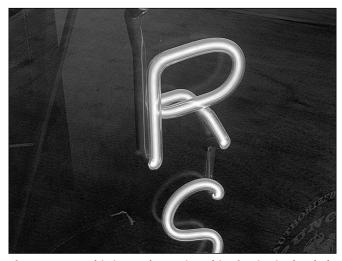
Figure 13-63: This image has quite a bit of noise in the dark end of the blue channel.

Using the Lab Color mode

The blue channel has been extracted in Figure 13-64 to show you the noise and crud that you want to clean up. Getting this done by using conventional means is not easy, but by changing the color mode to Lab, we can turn off the "L" and "a" channels and make some adjustments:

1. **With just the "b" channel showing, choose the Eyedropper tool and select a sample of the dark noise.**

   Be sure to zoom in enough to see it well.
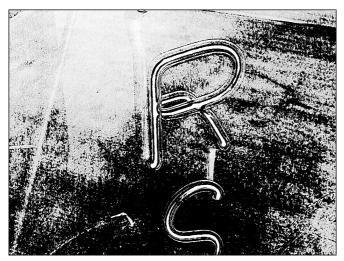
   Figure 13-64: The blue channel of the RGB image, showing the offensive digital noise

2. **Choose Select ⇨ Color Range, and add more grays or adjust the Fuzziness until you have most of the dirty area selected.**

   Click OK and go back to the image

3. **Click the Quick Mask mode.**

4. **Run a Gaussian Blur on the mask so that it encompasses all the digital noise.**

5. **Change to the Standard mode again, and try Dust and Scratches, or a Gaussian Blur to smooth out the graininess.**

   When you view all three channels together again, you can see that most of the digital dirt has been removed without changing the color, contrast, or quality of the image, as shown in Figure 13-65.

If the noise is part of the grayscale image, then you can do selective blurring on the "L" channel. If your image has been oversaturated, leaving unsightly artifacts, you can do this same routine on both the "a" and "b" channels. Then you can desaturate particular colors by using the Levels command on those two channels.

Figure 13-65: The image has had the noise removed by blurring it out of the "b" channel.

Another Lab technique concerns using the Curves command to adjust "a" and "b" channels to change the color in an image without touching the contrast. Just remember to use a straight-line curve. It's an oxymoron, but what it means is, *don't* let the curve curve. Drag the end points only, and keep them on a level or vertical plane. Move the opposite point an amount that will keep the center of the curve exactly in the center of the grid. This is the point around which everything is neutral gray, and if your curve goes to any side of that point, the color in the image shifts accordingly. Figure 13-66 shows an example of the maximum Lab curve adjustment that you can make.
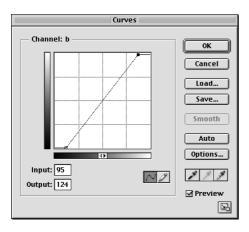
Figure 13-66: Keep the curves in the "a" and "b" channel vertical and crossing the center of the grid.

Other image cleaning methods

A similar method to what I described in the previous section is to isolate the blue channel of your RGB file. The blue channel is usually where the most noise occurs, and is the first place to look. Selectively blurring that channel, or running Dust and Scratches or Despeckle can go a long way to cleaning up the photo. With Despeckle, you get what Photoshop gives you, but Dust and Scratches allows you to make adjustments that you can see, so it's usually a better choice. This method of deleting dust and scratches take so little time, you may be ashamed to charge for the work.

This method takes a little time, but with small areas, it's a better choice than using the Clone Stamp tool:

1. **Select the Blur tool, and select a brush size that's appropriate to the size of small corrections you'll be making — say in the 10- to 15-pixel range.**

2. **Change the Strength to a fairly small number in the 15% to 25% range.**

3. **Decide whether you will be removing light spots from dark backgrounds or dark spots from light surroundings.**

   If it's the former, choose Darken in the Mode menu; if you're deleting dark spots, select Lighten.

4. **Now you need to run the brush over the hickeys and noise, and they just blur away into their surroundings.**

   You probably won't want to do a lot of touch-up this way, but for small clean-up jobs, this does the trick.

Cleaning up edges

There can be no final note about cleaning up an image — it's never perfectly clean. Just when you think you have everything under control, you either see something that can be just a little better, or you learn a new technique that you have to try. Usually, time and money come into play and you have to decide that the job is done. However, there is one Photoshop feature that you should keep in the back of your mind when you are compositing images: Matting. Just as you use the Transparency and Matte features with Web images, you can use the same type of effect in an image that's destined for print. Matting adds a level of professionalism to the finished piece by hiding the transitional edges of composited images.

It's virtually impossible to get a perfectly fitting mask or clipping path. You can get close, but your image will always have edge pixels that have a little too much of the background color. If the isolated area is going to go into a similar color environment, then you may not have much of a problem. For most images, however, the backgrounds differ enough to cause an edge to show here and there. The most outstanding examples are objects shot on a black or white background. If they are brought into a situation with the opposite colored background, you see a touch of an edge surrounding the object. The next time that you encounter this situation, go to Layers ⇨ Matting, and then proceed as follows:

✦ **White background:** If the object was originally shot with a white background, choose Remove White Matte.

✦ **Black background:** An object from a black background requires Remove Black Matte.

✦ **Multicolored background:** Use Defringe for a multi-colored background. The Defringe selection brings up a dialog box that allows you to enter the width of pixels that will be affected.

The Matting/Defringe command takes so little time that it's a crime not to use it. You don't have to run around the entire object looking for holes to plug or fiddle with the Clone Stamp tool to clean up the edges. These controls take care of it in one quick shot. I've run Matte Removal two or three times on the same object to get it just right. And if you are really, really picky, you can still go around and tweak here and there.

A History Lesson

You've probably used the History palette in your Photoshop work, but for those who haven't, Photoshop keeps track of the last 20 steps you took in your work on a particular image. That is to say, the default is 20 steps — you can change it to any number of steps that you have the RAM to accommodate. Keep in mind that the larger the history file, the more bogged down Photoshop's RAM gets, and it can affect your performance.

More than likely, you've seen the History function at work but never paid any attention to it. When a dialog box disappears, when you first open a large file, or when you've done something intense, such as a Gaussian Blur, you've seen blocks of the image build the image on the screen. Photoshop uses these blocks in the maintenance of History. It only keeps history on blocks that have had changes made in them. If you use the Clone Stamp tool in a small clean-up area, only that block is remembered in History. On the other hand, if you've done a Dust and Scratches, a Curves adjustment, or run an Artistic Filter, then the entire image must be written (or saved) to the History file. This is where you start to see a slowdown in performance.

At any rate, every change you make to an image is saved to the History file and is listed chronologically in the palette, starting with the oldest at the top of the list and the newest at the bottom. In the default setting, you can click anywhere in the list, and the image returns to the state it was in at that point in your creative efforts. You can make another adjustment of some kind, and the remainder of the history that happened prior to your selecting this History state is deleted (everything below the currently selected state). However, you can make several changes in the History Options dialog box, shown in Figure 13-67, to customize your workspace:

✦ **Automatically Create First Snapshot:** In the figure, you can see that this option has been checked. This option is the default, and it provides a starting point if you go too far and can't find your way back. It appears at the top of the History palette.

✦ **Automatically Create New Snapshot When Saving:** You can select this option if you want an extra safety net as you save.

Figure 13-67: The History Options dialog box allows you to create your own level of comfort.

✦ **Allow Non-Linear History:** The name of this option is a bit misleading. You can go back in History and delete a step, and this change affects everything that has been done afterwards. However, you can't make a change at this point and keep the rest of the "future" in place. All those steps are history, so to speak. For example, suppose you have done an Unsharp Mask, then a Curves correction, and then resized it and changed the color mode to grayscale (I don't know why you would do such a thing). When you realize your mistake, you can go back to the Unsharp Mask step and delete it. The image still has good contrast, is the right size, and in grayscale. However, if you figure you just need a little more Unsharp in the mask and you run the filter again, you end up back to the large, flat, color image. I think that's fair. With this option unchecked, as soon as you deleted the Unsharp Mask, you have to do everything over again.

✦ **Show New Snapshot Dialog by Default:** You can use this option to create new safety nets as you save and it allows you to name the snapshot and select how it is created. Figure 13-68 is a screenshot of the New Snapshot dialog box. If you don't select this option, you won't see the New Snapshot dialog box unless you choose New Snapshot from the History fly-out menu.

Figure 13-68: The New Snapshot dialog box allows you to name the snapshot, and choose to save the full document, merged layers, or just the current layer.

> **Tip**
>
> Regardless of what you've read, History doesn't last forever. When you close the document, all history and snapshots are deleted. For this reason, whenever I think of saving a snapshot, I usually just do a Save As in Photoshop PSD format so I'm really safe with all the layers intact.

The History Brush

A really clean and quick cleanup is handled by using the History Brush. This tool works by drawing information (literally) from a snapshot or previous state of the document. Suppose that an image has a lot of dust on it from a dirty scan. Figure 13-69 is such an image. The clean-up process is simple:

1. **Create a snapshot of your image in its pristine state.**

   This is done just to be on the safe side in case things head south on you.

2. **Run Filters ⇨ Noise ⇨ Dust and Scratches on the entire image.**

3. **Click the box to the left of the Dust and Scratches entry in the History palette, and select the original image.**

   The filter effects are gone.

4. **Switch to the History Brush tool in the toolbar.**

   Select a brush that's not too large, but big enough to make it easy to hit the dust spots.
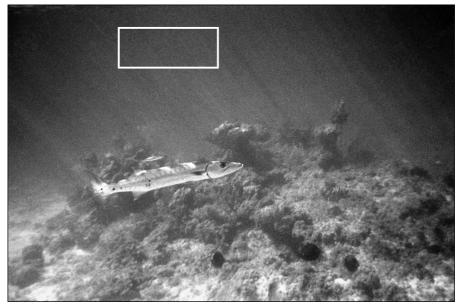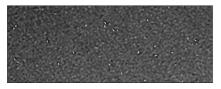
Figure 13-69: The area in the rectangle is filled with large specks of dust that can be cleaned up with the History Brush.

5. **In the Options bar, change the Mode to Lighten for dark dust, or Darken for light dust spots.**

6. **Now, click the cursor on the dust specks.**

   The History Brush reads the layer that you checked in the History palette, and fills in the dark or light spots in the image. Because it's coming from exactly the correct spot, the changes are usually invisible. Whatever you do, though, don't use mouse strokes or drag the mouse around the image. These actions show up every time. You can also adjust the Opacity and Flow of the brush as you work to get the nicest corrections. The results are shown in Figure 13-70.
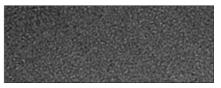
Figure 13-70: The dusty image (left) and the image cleaned up with the History Brush (right)

Beyond cleaning up an image, you can create some really creative effects by running an Artistic or other type of filter on the image and then painting particular parts of the pristine image with the filtered image. Depending on the Mode settings that you choose, you can make some very spectacular images — which brings us to the cousin of the History Brush.

The Art History Brush

The Art History Brush is the History Brush after a night at Starbucks. It also relies on a previous state of the image, or a snapshot, but instead of painting *just* that image exactly on the new image, it calls on a gazillion attributes you can set in the Brushes palette. Figure 13-71 shows the original photograph, taken just north of Vero Beach, Florida. It wasn't the great shot I had hoped to get, so it seemed like a good candidate for a painterly approach.

After experimenting with various brushes, I found a round brush and added a gravelly texture to it. I kept to a fairly small brush tip size (27 pixels), similar to what I'd use if I were actually painting it. Then I adjusted the settings as follows:

✦ I set the Mode to Normal.

✦ I set the Opacity to 100%.

✦ I selected the Dab style.

✦ I adjusted the Area to 20 pixels.

✦ I chose a Tolerance of 100%.
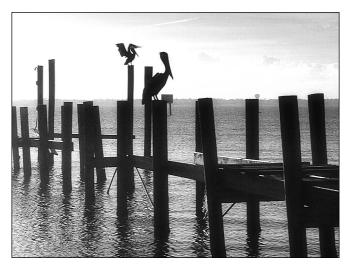
Figure 13-71: The original pelican photograph, before painting with the Art History Brush

I find most of the other brushes to be a little unwieldy for the size image I had to work with. Finally, I added a new, blank layer above my original layer. I wanted to paint on it so I could finagle other effects at a later time.

It was a matter of painting around the image after that. Depending on the amount of detail I wanted, in some places I made the brush smaller or larger by clicking on the square bracket keys "[ ]", but varying pen pressure was adequate for most of the work. It didn't take too long to get to the image shown in Figure 13-72.

Figure 13-72: The entire image has been painted with the Art History Brush.

After I finished painting, I decided that there was too much paint and not enough detail and texture. So I copied the base layer by dragging it to the New Layer button at the bottom of the Layers palette, and placed it above the base layer and below the painted layer. Then I ran the Rough Pastels filter on the new layer. The painted layer had its visibility reduced to 46%, and the base layer was discarded, leaving the image shown in Figure 13-73. Unfortunately, black and white doesn't do justice to the subtle colors in the original image.

Figure 13-73: The finished photopainting

Actions

I'm tired. You're tired. We all work too hard and we don't get paid enough. Thankfully, though, Adobe set us up with an Actions palette in Photoshop. Two things to know about this palette:

✦ If you spend more than a couple minutes creating a selection, you should save it as an Alpha channel.

✦ If you have to repeat a task more than three or four times, make an Action to do the work for you. Create an Action especially if you may have to repeat this task sometime in the future. It pays you back in time and money every time you use it.

Creating an action

Actions couldn't be easier to do, unless you had someone else do them for you while you were at lunch or lying by the pool. It's a matter of recording your actions — hence the name — and saving the result. For example, suppose that you have a folder of 40 portraits of various sizes, but you want them to be equally sized for

printing in a brochure. Doing them one at a time will take you most of an hour, and you'll have to keep on your toes to be sure that the newly sized images get into the correct folder. Letting the program do the work is a better choice.

To create an Action, it's a good idea to go through the steps you want in the Action before you start recording. This can be a mental process, or maybe you'll want to actually do one or two Actions in order to find out exactly what needs to be done. If it's fairly complicated, you can resort to writing the steps down so you don't accidentally leave something out.

For example, suppose that you want to change an image to grayscale and reduce the height of the image to 9 picas (the width will vary). You also want the resolution to be 300 dpi, and you also need to use the Unsharp Mask on the downsized image. While you're at it, you figure that you will add some copyright information and put a plug for your Web site into the document information that will follow the image wherever it goes. Finally, you want to save the document in a particular folder.

With all this in mind, you mentally work out the course of events and go through it one time — after all, you have those 40 portraits of various sizes to work with, so you may as well get it right. To create the action, follow these steps:

1. **Go to the Actions palette and either click the Create New Action button at the bottom of the palette, or choose New Action from the Action palette menu.**

   As soon as you do either, the New Action dialog box appears, as shown in Figure 13-74.

2. **In the New Action dialog box, name the Action and place it in the default actions set or one of your own.**

   You can also apply a Function Key to the Action and give it a specific color to make it easier to find in the Actions Button Mode.

3. **Click Record, and you're on your way.**
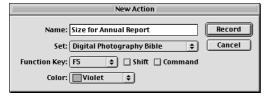
Figure 13-74: This is the first window you see as you start a new Action.

4. Go through the motions that you want to record in the Action.

It's important to know that things can go sour on you quickly while you're writing an Action, so I recommend that you create a snapshot as your first item in the Action list.

5. Choose File ➭ File Info, and enter information that you want to travel with the electronic file, as shown in Figure 13-75.

I start here for no other reason than from moving left to right.

6. Choose Image ➭ Mode ➭ Grayscale.

If you want, you can just as easily change the mode to Lab, select the Channels palette, and delete the "a" and "b" channels and *then* change the mode to grayscale.
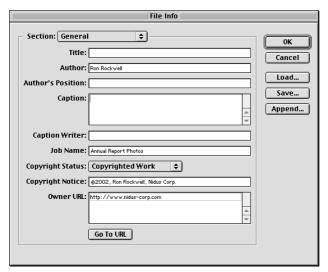
Figure 13-75: The File Info panel set for the files you want to modify as a group

7. Go back to the Image menu for Image Size adjustments.

It's important that you actually enter numbers in fields, or else you may end up with files that don't change. I modify the numbers in my dummy document so I can change every field that I want to change. In this case, I finagled the Height and Resolution fields and units of measurement. Photoshop's manual tells you that if you're going to make a change in the size of an image, you have to use percentage instead of any units of measurement, due to the chance that you may be working your action on a batch of files, and some of them have different units of measurement. If you want an image to be 9 picas high,

and the field opens up in inches, you may have some pretty large files to throw away. In my experience, I've found that if I change the measurement in my dummy document to Columns, and then make the change to Inches or Picas as I need, the modifications go as planned.

8. **In your Actions recording, change the Height unit of measurement to Picas, and then enter 9 in its field.**

9. **Hit the Tab key to go to the Resolution field, enter 300, and click OK.**

10. **Choose Filters ⇨ Sharpen ⇨ Unsharp Mask and adjust the sharpness until you feel it is correct.**

   Keep in mind that these settings are used on all images that you run through this Action — be sure that you're comfortable with the changes if you don't want to stop and make the adjustments on each image. (I discuss this further later in this chapter.)

11. **Click OK to exit the Unsharp Mask window.**

12. **Choose File ⇨ Save As.**

   Change the file type (your dummy has an incorrect type listed so your change is noted by the Action), and navigate to the folder in which you want the file saved. Whatever you do, *don't change the file's name!* If you do, every document that the Action sees will get the same name.

   At this point, you may be excited about being finished with your Action, and attempt to run it. Don't do this yet because you're still recording!

13. **Go to the Actions palette and either click the red circle button at the bottom of the palette, or choose Stop Recording from the Actions palette menu.**

   You won't receive any confirmation that anything is different, or that you've completed the action, but you should see all the events that you've recorded in the palette, as shown in Figure 13-76.
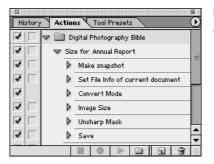
Figure 13-76: The custom Action as shown in the normal mode

The normal Action palette mode allows you to tuck the triangled steps into the Action's named slot. If you open the triangle, you can select any of the steps and run them on your image, but every action below that point on the list is executed as well. If you don't want to have the long list of Actions and their individual steps,

you can choose the Action Button Mode from the Actions palette menu. This menu is color-coded (as shown in Figure 13-77) with colors that you choose when beginning the Action, and the button shows the Function Key you chose as well. You can't cherry-pick intermediate steps in the Button Mode.
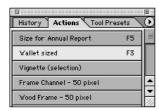
Figure 13-77: The custom Action, as viewed in the Button Mode, is color-coded.

As the Action plays, you see some things happen, and other things happen behind the scenes. This is fine with me, but if you have a voyeuristic nature and want to watch every step of the work that's going on, you can select Playback Options in the Actions palette menu, and change a few attributes there:

✦ You can deselect the default Accelerated button to show everything in real time.

✦ You can select Step By Step, which makes Photoshop do a step in the Action and then wait for you to click a Continue button before it takes the next step.

✦ You can set the Action to pause for a given number of seconds.

✦ You can select or deselect the Pause For Audio Annotation box. If you leave this checked, the Action stops until the audio is finished. Unchecking this box allows the audio to play as the Action continues.

You may think it silly to attempt to have the Action run the same Unsharp Mask settings on every document as though they are all the same—and you are right. In order to make the Action stop to let you change values, move curves, or enter text, just click the square to the left of the Action's name. This places a black dialog icon in the square. When the Action reaches that point, it does everything—such as fill out all but the filename or caption in the File Info dialog box—and then waits for you to continue.

Note   Certain items, such as a change in views or painting and drawing movements, can't be captured and repeated in an Action. If you want to paint or draw something, insert a stop in the Action when you want to take over and draw. These are called *modal controls.* You accomplish the stop by choosing Insert Stop from the Actions palette menu. Photoshop waits for you to click the Play button, whether you choose to draw or not. If you need to have a path inserted in the image as part of the Action, you must have a saved path in the document; then when you want it placed, choose Insert Path from the Actions palette menu.

Audio Annotations

If you haven't toyed with Audio Annotations, you may want to put it to good use — or just startle the heck out of people. To create an Audio Annotation, you must have a sound card installed and a microphone connected. A button called the Notes tool in the toolbar is used for written annotation, and its fly-out button does the audio work. Select the Audio Annotation tool and click it somewhere in an open image. A small dialog box appears with instructions to click the Start button to begin recording. Then speak into the microphone. Click the Stop button when you're finished.

The annotation stays with the image but it doesn't print. To make it play during an Action, just double-click it at the appropriate time and it plays according to the options you selected in the Playback Options box. If you want to remove the annotation, you can either click it once and hit the Delete key or drag it off the image. If you crop the image and the annotation is outside the crop area, it is deleted as well. You can't copy the annotation from one document to another by using the normal methods, but you can import them, and they must come from PDF or FDF files. The idea of annotations (especially the speaking kind) may seem frivolous, but if you have something that you want to remember in a couple months when you play the Action again, an annotation can save you a lot of hair pulling.

When you decide that you'd rather not have one command in the Action run, click the check mark at the far left of the command's name. Click it again, and it becomes part of the action, so to speak. To let you know that you've turned something in the Action off, the check mark for the name of the Action turns to red — this way, if you've closed up the triangle to nest the commands, you can still see that something is different.

Creating Droplets

After you've spent the time to make an Action, why hide it inside Photoshop? Face it — you just loaded 38 images onto the computer. Instead of opening them one at a time, giving each a name, changing the color space, and saving them with a new file type to an existing folder, why not let the computer do the work for you? Again, the Adobe engineers put in the extra thought and energy (bless them!) and made it easy for us. All you need to do is go to File ➪ Automate ➪ Create Droplet and fill in the blanks, as shown in Figure 13-78:

✦ **Save Droplet In:** You must give the Droplet a name and location.
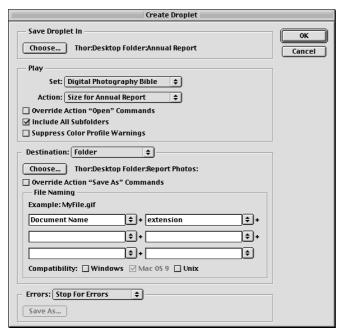
Figure 13-78: The Create Droplet dialog box

✦ **Play:** You search for the Action you want the Droplet to play, and set options for a few factors:

  • **Override Action "Open" Commands:** This option is a little tough to get your head around. Suppose that you have recorded an Action that required Photoshop to open another file for whatever reason. With this option selected, the Action ignores the filenames you have specified, and instead, opens your batched files. Deselect the option if you want specific files opened, or if you want to work on files that you already have open.

  • **Include All Subfolders:** This option simply lets the Action go through all the folders in the folder you have selected — the Action won't stop just because it sees a folder instead of a document; it keeps looking for more documents.

  • **Suppress Color Profile Warnings:** This is the equivalent to checking the Don't Show Again box in the Profile Mismatch warning box. It's up to you, but if you're serious about color management, you should leave this unchecked so you can keep on top of your work.

✦ **Destination:** Select the destination for your modified files from the following options:

- None

- Save And Close

- Folder

✦ **File Naming:** You have 19 choices in the way your files are named, plus an additional 19 choices that can be added to your first choice. It's basically a choice of document name, a serial number or letter, the date, and a file type extension. If those aren't enough, you can make the name all caps, sentence case, all lower case, one through four numbers or letters, and seven different ways to note the date. Select any of the choices in the first field, and then select a second name or convention for a more extensive name. Whatever you have in mind, Photoshop has probably got you covered!

✦ **Platform Compatibility:** You have a choice of compatibility in Windows, Mac, or Unix.

✦ **Errors:** You can choose to have the Droplet deal with errors in two ways:

- Stop For Errors

- Log Errors To File

When you finally click the OK button, a new icon appears on your desktop or wherever you decided to have it reside. All you have to do is drag that folder of fresh images onto the Droplet and head out to Starbucks. The Droplet fires up Photoshop, runs the Action (you can make it run several Actions, by the way), and quits Photoshop again. It's a pretty slick tool to become intimate with.

Summary

Whew! This has been quite a chapter. In it you've learned about the new features in Photoshop 7, including the Healing Brush and new painting controls. Then I launched into quite a few ways to create selections and masks to edit your images. I touched on the use of Curves, the Levels command, knockouts, Quick Masks, and various ways and means to clean up dirty scans or noisy digital images. I explored the History and Art History Brushes, and finally I explained how to make Actions so you can make the best use of your time. In general, you found out that Photoshop is one heck of a program!

✦   ✦   ✦

Photopainting

The worlds of photography and painting have traditionally been separate realities, and furthermore, they have been at odds with each other for well over a century. The painting world has viewed photography as an interloper and a threat. Photographers have always felt limited in their ability to abstract and expand into expressionist areas that are so prevalent in painting. These differences have been at the core in defining artistic principles of both mediums. Therefore, photography and painting coming together within the new realm of digital photography heralds a significant change to the status quo. This is what photopainting is about: a new partnership between painting and photography. This chapter answers some basic questions about this new medium:

✦ What is photopainting?

✦ How can photopainting serve my needs as a photographer?

✦ Do I need to be skilled in painting techniques to photopaint?

✦ Do I need special equipment, software, or training in order to photopaint?

✦ What are some of the basic tools and principles of photopainting?

✦ How do I apply photopainting to my photographs?

You are about to get the answers to these questions and more while getting a good look at the very new and exciting world of photopainting.

What is Photopainting?

Photopainting merges digital photographic and natural-media digital painting techniques through automated or hands-on interactive methods to create a new hybrid style. *Natural media* digital painting simply refers to the process of making

brush strokes that look like strokes made by traditional artist brushes, pens, and other tools. The final images are not purely photographic or purely painted but are rather a blend of the two. When you view a photopainting, it is a new and unique visual experience, which pushes the envelope of what most people understand as photography or painting. You'll get a much better idea of what a photopainting is if you see an example, so take a look at Figure 14-1.

Photopainting expands the ability of photographers to express more abstract visual concepts in their photographic compositions. Due to the integration of digital technology, the lines between traditional mediums are becoming more nebulous, which is threatening to some but exciting to others. One thing is for sure — a whole new era of photographic interpretation has begun. This new hybrid is only possible through the world of digital photography and the new software and hardware that allow the simulation of real world painting styles within the computer environment.

Figure 14-1: An example of a photopainting

Since the invention of photography, photographers have experimented with ways to alter the image after the photograph was fixed to film. This involved many techniques done in the darkroom to push the photo beyond what could simply be captured on film with a camera alone. In fact, darkroom manipulation and photo retouching can be considered the precursors to photopainting. The desire to do

more post-processing manipulation of photos is not new; the tools at our disposal have just been limited. The advent of the digital darkroom resulted in the automation and expansion of darkroom techniques, but these techniques weren't redefined to realms beyond what photographers were commonly familiar with. Natural media digital painting tools — invented by Metacreations and realized in the software product called Fractal Painter more than a decade ago — was the beginning of a revolution in photography and painting. Even after the introduction of this powerful type of software, it took years for the input and output devices to catch up and make photopainting a reality. Only in the past few years has the potential of photopainting been realized to its full extent and is now being used to achieve professional results.

The program formerly known as Fractal Designs Painter is now owned by Corel and is currently selling as procreate Painter. This program has become the standard for natural media digital painting, just as Photoshop is the standard for image editing. The current trend followed by most high-end graphic software packages is to combine paint and editing tools. This includes Photoshop 7, which has included a whole new array of sophisticated paintbrushes. procreate Painter is still in a league by itself and offers a seemingly endless array of interactive tools to simulate almost any artist medium — right down to the thickness of oil paint, texture of the canvas, or bleed of watercolor on paper. These simulations are all done with digital algorithms that interact with the pixels in proximity to the virtual digital brush cursor, which approximates bristles, pens, chalk, and so on. To augment the software, companies such as Wacom produce pressure-sensitive tablets that allow the user to manipulate the digital brushes in much the same way as real-life artists would. This manipulation produces a digital painting environment every bit as sensitive to the artistic expression as any other painting medium.

Paint software has provided much to allow the trained artist to work in familiar ways, but it has also provided more automated approaches, which require very little training in painting techniques to get very dramatic results. I present exercises in this chapter that help you acquaint yourself with the various levels and styles of photopainting that you can apply to your own level of skill and need. After you see what advanced digital painting can do, you may decide to get some extended training in painting — likewise, many painters have made the camera a common tool in their studios.

You may be wondering what photopainting can do for you as a photographer. Simply put, it gives you the opportunity to alter your image in ways that provide a more subjective and painterly quality. Photographs are usually literal by nature and viewers of photographs often use the literal reference as a starting point for interpretation. Photopainting, like some digital darkroom techniques, alters the original image through software procedures. Photopainting, however, takes you beyond the darkroom methods by introducing natural media, a technique that tends to make the photograph more emotionally appealing and that removes the image from the responsibility of being absolutely factual. For example, photopainting can introduce texture that can make the viewer aware of surface quality, as shown in Figure 14-2. It can also create pastel-like strokes that produce a very soft and ethereal mood or

thick, strong brush strokes that indicate a powerful emotion or movement. The key is in the abstraction of a photograph into a simpler, more dynamic form that more closely approximates a painting. Paintings often accentuate the key elements and suppress unnecessary details, which often results in their becoming more powerful statements of subjective thought. If you want to introduce subjective reality into your photographic compositions, then photopainting is a good way to do it.

Figure 14-2: You can see how the natural media brushstrokes add a new look to a photograph.

Photographing with Photopainting in Mind

Before I discuss the techniques that you can use to create a photopainting, you need to know the considerations that come into play when trying to take a photograph that is a good candidate for a photopainting.

Focus on the essentials

Because photopainting generally isn't aiming its result at the literal, but more at the abstract and subjective expressions, it's important to consider this fact when you are composing and shooting your photographs. As with any paintings, photopaintings often blend elements from numerous sources, such as photographs, special effects, and hand-drawn elements taken from life or imagination. Keep this in mind as you gather a series of shots for a variety of source material, which can come in very handy later. When taking photographs for use as a photopainting, you have greater

freedom in the types of images that you can create. For example, if the background is not something you intended to keep in the photopainting, ignore it and you may gain greater freedom when composing other parts of the shot. Don't worry about that branch that is in the way—you can remove it later. Focus on creating the final work and don't be so tightly controlled by the single photograph concept. You don't need perfection, just the essential elements. Just as a painter may use a number of photographs for reference, so the photographer can as well when working in this way. Figure 14-3 shows an example of a photopainting in which elements from a number of different photographs were combined before turning the image into a painting.
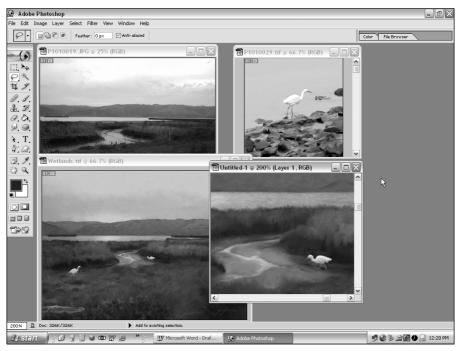
Figure 14-3: A number of photographs were combined to make a single photopainting.

Image quality and size

In general, the quality of photographs used in photopaintings, in terms of resolution, doesn't need to be as high as for literal works. The reason for this is that the process of abstraction and simplification removes much of the fine detail that is inherent in literal photos. A medium- to low-resolution photo can make an excellent photopainting under many circumstances.

A more important consideration than resolution is *relative size,* which is how different reference photographs may fit together, like puzzle pieces, during the process of compositing. For example, suppose that you're taking a shot of a tree from a good

distance with the intention of having it in the foreground. The detail level in the tree won't hold very well when you resize to the foreground over a new background. To get the detail that you want, you must take a close-up to make it work. Stay aware of these relationships when composing your source material. However, I'm not saying that you can't make an excellent photopainting from a single photograph; I have done so many times. Just don't feel that you're limited by a single image.

Detail versus design

Shooting photographs for photopainting requires an adjustment to the usual photographer's mindset. Most photographers strive to see what the camera sees, but photopainting requires you to shift gears to a certain extent. For photopainting, you must learn to see what a painter sees and then adjust how you compose your photographs accordingly. Seeing the abstract elements over the details is essential. You are the painter, the designer, and the architect, and with photopainting, your ability to adjust reality just became godlike—so use this power to determine how to develop and capture your vision. Your job is changing from depicting to designing and the photograph is just the starting point for this process. A good rule to remember is that minute detail is almost always lost in the transformations of photopainting, so don't obsess about the details when taking the shots. (See Figure 14-4.)

Figure 14-4: Elements such as the parking lot and the apartments shouldn't stop you from taking a shot because you can eliminate them in the final composition.

Painting Skills

Do you need to be a skilled painter to photopaint? If someone asked you, "Do I need photographic skills to take a great photograph?" You would most certainly say "yes." However, you would also have to admit that the automation of modern cameras has made it possible for non-skilled photographers to take good pictures. Paint software provides many ways to create painterly effects with automated tools by using a "click and paint" approach. You can also use layering to trace, clone, overlay, and erase. These techniques can be very effective if used in a sensitive manner. So the real answer is "No, you don't need painting skills, but if you have them, you can go to a much higher level." Try to think of it from the other direction — the painter that is starting to photopaint has no choice but to learn photography because the basis for photopainting lies in the photograph. I think that you, as the photographer, would be wise to embrace painting in the same way.

Painting Software

Before I give you a closer look at the top software programs used by most photo-painters, I discuss some of the general features of paint programs so that you can become familiar with the specialized tools, types, and techniques that are commonly used. I then take you through a number of exercises using the two leading programs, which explain some of the more obvious capabilities of paint software. These exercises demonstrate the levels of complexity from automated functions to total hands-on painting techniques, so you can get a good idea of the range of capability, which is very broad and highly adaptable to individual styles. However, you should realize that these software applications are very rich and have many levels of variables, so I can't go into all the possibilities here.

The two applications that stand out from the crowd are procreate Painter 7 and Adobe Photoshop 7. Many other applications are available that you can use separately or in conjunction with these two (I discuss these other applications later in this chapter). Keep in mind, though, that no single application can do it all — at least I haven't found one that can. If I had to pick only two applications to use, however, these would be the ones. Everyone has his or her personal favorites, and you will most likely purchase a group of applications that perform the tasks that you need for your style. I suggest that you get time on as many applications as you can in order to determine their strengths and weaknesses relative to your style.

I often use an application for a particular tool that I find especially useful and that I can't find anywhere else. How much jumping from application to application is necessary varies from person to person. Some tell you that you can produce better work by learning to use one program well, and others want the freedom of using whatever works to get the job done. In fact, it's always a good idea to network with other artists and find out which tools and techniques they use (if they are willing to share this information). I am always amazed at what other people do with these

programs. Painting tools usually have a high degree of customization capability, which means that you can create tools that no one has ever used before. This allows you to develop a very personal style.

Natural media brushes

Brushes are the backbone of any paint program and the sophistication of their performance determines, to a large extent, the capability of the program. Paintbrushes are defined by their ability to simulate real world painting appearances and techniques, which is accomplished with unique algorithms that simulate natural media painting and drawing on the computer. This allows the brushes to simulate the actual physics of natural media in the virtual environment. Not only can you change the shape and size of brushes, you can determine if they act like watercolors, pastels, oils, pens, pencils, airbrushes, or even markers. The list of changeable parameters is quite astounding.

Another revolution in paint simulation was the addition of a dimensional reality to the brushes, which simulated *impasto* (the visual thickness of paint). In addition, you can change the texture of the painting surface and reflect how paint flows from the brush. For example, pastel brushes reflect a textured grain of paper—just like in real life.

Natural media brushes also take advantage of pressure-sensitive input devices to enable more dynamic brush strokes, based on the subtle movements of the artist's hand. This allows you to make dynamic strokes that can move from thick to thin within a continuous movement by altering the pressure on the pen—just as you would do with a real brush or pen. You can set the sensitivity of the pen to control many painting parameters. Every program handles brushes in different ways, which gives them unique capabilities and results, as shown in Figure 14-5.

Textures

The use of texture in photography, until recently, was limited to the texture of the printed surface or the use of special filters in the exposure. Typically, photos have a smooth appearance because most photographic printing papers are smooth. Texture is normally associated with conventional painting mediums—not photography. This mindset is changing since the advent of photopainting.
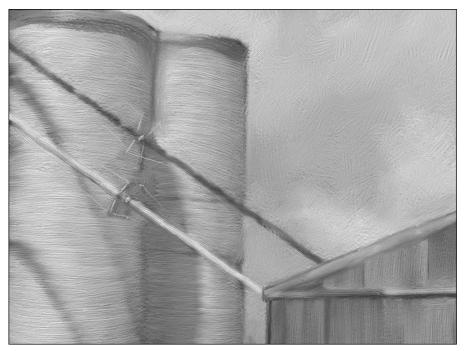
Figure 14-5: Some typical brush strokes showing the dynamic qualities

In order to achieve many natural media styles, it is necessary for the paintbrushes to interact with textures. If you're not familiar with textures, you can see some examples in Figure 14-6. Textures can be made to look like canvas, pastel paper, or watercolor paper. The possibilities are really endless. You can achieve textures in photopainting in a number of ways:

✦ **Adding dimension:** One method is to simulate a texture in the image by creating a dimensional surface that reacts to a virtual light source and produces highlights and shadows.

✦ **Using an alpha channel map:** Another technique is to use an alpha channel map that uses the dark and light tones of the map image to alter the luminance of the pixels to produce a highlight and shadow effect.

✦ **Simulating grain:** A common way to add texture to a photograph is to add grain, which is seen on conventional film that's been blown up to large degree. You can add grain artificially to photopaintings for effect.

✦ **Using a textured printing medium:** You can also print the image on a textured *substrate* (media on which we print). The effect of texture and grain adds another dimension to photopainting.
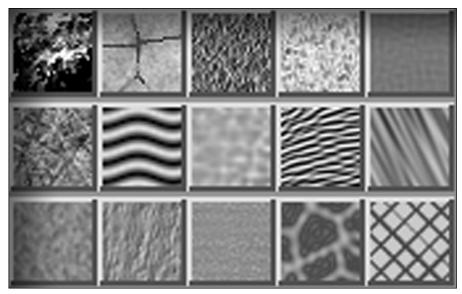
Figure 14-6: Examples of texture maps

Natural media filters

Natural media filters are generalized algorithms that are applied to all or part of an image to simulate a natural media style. They usually come with programs or are added as plug-ins. Filters are different from brushes in that you don't use a cursor to interact with them; they are a regional effect. Some come with control panels, like the one shown in Figure 14-7, that allow you to change the parameters and get a range of effects. Photoshop 7 comes with a substantial list of these types of filters that simulate watercolor, fresco, pen, pencil, pastels, and more. One word of caution about filters: They are limited in their abilities compared to what *cloning,* a process that lets you paint in portions of another image or another part of the same image, or hand painting can achieve. Filters give a very stylized look, which is easy to identify. To mitigate this canned look, I recommend that you work with multiple filters in combination to produce more original results. Filters are handy if you need a quick solution or if don't have the skill level to achieve more sophisticated results. Plug-ins such as Xaos's Paint Alchemy provide a rich interface for complex variations to filter effects.

Figure 14-7: An example of a natural media filter and control panel

Pattern brushes

Some programs, such as procreate Painter and Photoshop 7 can also use patterns and images — not just color — as a paint source for brushes. You can see a sample from such a pattern brush in Figure 14-8. The brush references a source image(s) and paints that source in a continuous tiling pattern. You can queue some brushes to use a single image or a series of images that are created on a transparent background. This allows the images to overlap as they are put down on the path of the brush. You can set size, rotation, color, opacity, and more for image brushes. You can use pattern brushes to interactively apply textures or backgrounds. Image brushes can be useful if you have a repeating element that you want to put in many times, such as leaves, grass, or a floral pattern. You can usually create your own source material for these kinds of brushes.
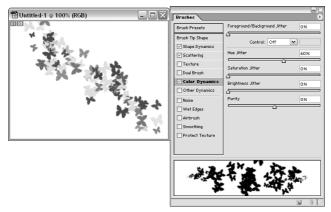
Figure 14-8: A sample pattern brush in Photoshop 7

Cloning

Cloning, a method used by many paint programs, has a large impact on photopainting. Cloning allows the program to replicate pixel information from one area of an image to another, from one layer to another, or from one image to another. You can use this feature to modify a photograph by cleaning unwanted visual elements, expanding elements already present, transferring elements from another image, or transforming elements between locations. In its simplest form, the clone function just duplicates the pixels from a target to a new location. In more complex forms, cloning uses algorithms to alter the pixel arrangement as you move the Clone brush, using the source image as reference.

The heart of complex photopainting resides in this latter form of cloning. By using your photograph as the clone source, you can then apply a host of Clone brushes that have various natural media qualities to the clone image. The Clone brush picks up its color and luminance information from the source image and applies it to the clone in a modified form, based on the algorithm that has been set for that brush. Cloning is like tracing and painting at the same time. The movements of your pen make a difference on how the strokes are laid down, but it is not completely painting by hand. This is a combination method of painting, where the process is partly automated. The next section examines the fully automated version.

Autocloning

Autocloning uses the same base process as cloning, except you don't interact with the image by using a brush. Autocloning operates more like a filter while using the same algorithms that cloning brushes use. Not every cloning brush works in this

automatic mode. When you are in Autoclone mode, the program places dabs of the brush type you have selected, but not all cloning brushes allow dabbing. The program has no way to actually draw so it accomplishes the painting by placing enough dabs to cover the image. So you get a generalized filter-like effect.

A few more sophisticated Autoclone brushes are available. One notable one is the Auto Van Gogh in Painter. It does some calculations on how to place brush strokes on varying angles, based on contrast in the image. The effect can be quite nice. I think more Clone brushes like this will appear in the near future. Autocloning is quick and easy and very cost-effective for low budget and rushed projects. Just understand that it isn't going to give you the subtlety of human interaction.

procreate Painter 7

Painter is by far the leading and most competent paint program on the market today. Fractal Design Corporation, the company that originally created Painter, developed a unique set of algorithms that simulate natural media painting and drawing on the computer in a way no one had ever seen before. Painter is now owned by Corel Corporation and distributed under the procreate line of products as procreate Painter 7.

Painter also includes many automated features, which allow the non-artist to achieve many painterly effects. Many of the preset brushes can be autocloned to apply a natural media style to a selection or an entire picture. There are also special variants that are designed to simulate some of the most popular painting styles, such as impressionism, pointillism, and even the brushwork of Van Gogh. Every brush is customizable and can be altered and saved as a new brush. The photopainter can choose to go with fully automated approach, a combination of auto and hand painted, or fully hand painted depending on the skill level and the desired look.

The brushes have many attributes that allow you to control them in very precise ways and to customize them to suit your individual style. These attributes fall into a number of categories:

- ✦ Airbrushes
- ✦ Standard brushes
- ✦ Cloners
- ✦ Dry media
- ✦ Erasers
- ✦ F-X (special effects)
- ✦ Felt pens

✦ Image hose

✦ Impasto

✦ Liquid and liquid ink

✦ Pens and pattern pens

✦ Pencils

✦ Photo

✦ Tinting

✦ Watercolor

The brushes are controlled by a complex array of parameters that determine how the paint flows from the brush and how it interacts with the selectable texture of the surface. In addition, some brushes have a pseudo impasto effect so you can set the thickness of the paint and actually see the dimensionality of the strokes. You can see an impasto effect in Figure 14-9.
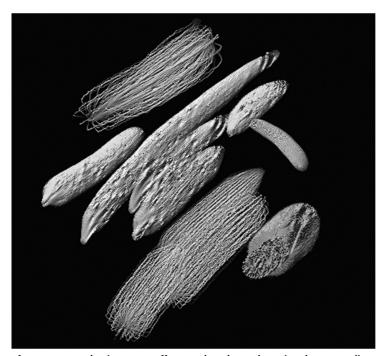
Figure 14-9: The impasto effect on brush strokes simulates mediums such as oils and acrylics with a high degree of visual fidelity.

Another outstanding feature is that many brushes actually have individual bristles that can be controlled in terms of their number, density, and how they pick up, put down, and move color. You can set some brushes to pick up a unique color on every virtual bristle of the brush. You can see an example of this feature in Figure 14-10. This approaches the complexity of real world brush strokes. Furthermore, almost all the brushes in Painter can be set as clone brushes and are fully customizable.
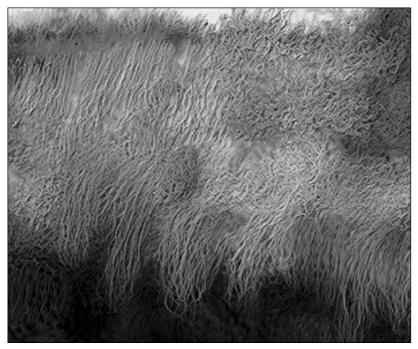
Figure 14-10: A close-up of a camel-hair brush laying down multiple colors simultaneously

Painter's Watercolor brushes are quite amazing. This is about as close as you will get to real watercolor without getting wet. When you choose a Watercolor brush, Painter7 creates a whole new layer, called the Wet layer, which is used exclusively to create watercolor effects. The Wet layer has unique qualities that allow for the paint to flow and diffuse in to the surface as though the paper were really wet. Painter 7 has even introduced gravity so you can get colors to flow down the paper into on another color to produce superb washes. The colors are transparent, like real watercolor, so they mix in an overlay buildup process. You can wet the entire surface or dry it, which changes the way the colors mix and interact. By combining wet layers with other paint layers you can produce some startling looks. For example, you can put the photo on one layer and then use a wet layer to wash over the image to create a nice wash effect. (See Figure 14-11.)

Figure 14-11: Here you can see effect of using watercolor in conjunction with pen outlines to create an illustration effect.

It is impossible to go into detail on all the different brush styles in Painter in this chapter. However, I want to give you a brief look at a few so you can understand the capability of this program. You can take a look at the others and experiment with what they can do.

Painter7 has a very robust texturing system that allows the texture to interact with the paint. When you are simulating certain types of mediums, such as oils, pastels, or watercolors, texture becomes very important to the final look. The canvas and paper texture must be visible in order to make it believable. Painter comes with an extensive library of preset textures, which you can add to by photographing real world textures and capturing them within the program. Just adding texture to a photograph can work wonders, as you can see in Figure 14-12.

Figure 14-12: This image shows the effect of texturing with a watercolor filter.

Creating a quick illustration

In this exercise, I take you through the process of cloning, autocloning, and using layer attributes and color controls to quickly create a very natural style illustration that you can use for a brochure or a wine label. I start with an average photograph of a lily pond that has a wonderful collage of leaf forms with just a touch of water showing. I want to make this so it has the appearance of a painted, loosely defined image (more impressionist, you might say).

1. **Open the file** `Lilypond`**, which is shown in Figure 14-13, from the CD-ROM.**

2. **Go to the Select menu, and choose Select All.**

Figure 14-13: This lily pond photo is the starting point of this exercise.

3. **Go to the Edit menu, choose Copy, and then choose Paste.**

   This creates a new layer with a duplicate of the image.

4. **Operating on the new layer, go to the Effects menu, and choose Surface Control/Woodcut.**

   Use this filter to create an outline effect, as shown in Figure 14-14.

5. **Set the Woodcut control panel parameters to Output Black, Black Edge 12, Erosion Time 4, Erosion Edge 1, and Heaviness 41%.**

   Adjust these controls for a heavier or lighter look.

6. **In the Object Palette, set the Layer Composite Method to Multiply.**

   This merges only the dark portions of the image with the layer below.
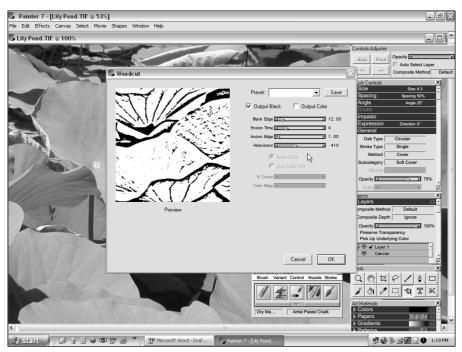
Figure 14-14: Creating an automated outline

7. Set the Layer Opacity to 50% to reduce the contrast.

If you want to, you can also adjust the color.s

8. In the Layers Menu, choose Drop or Drop All to merge the two layers together.

This results in an image like the one shown in Figure 14-15.
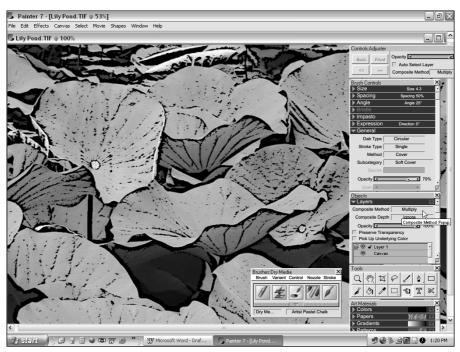
Figure 14-15: A composite of the two layers

9. **Go to the Effects menu and choose Tonal Control/Adjust Colors.**

   The Adjust Color control panel appears, as shown in Figure 14-16.

10. **In the Adjust Control Panel, choose Uniform Color, and enter 86% in the Saturation field.**

    No need to be too precise; this is at your discretion. This setting increases the intensity of the colors to make the image look more painterly.
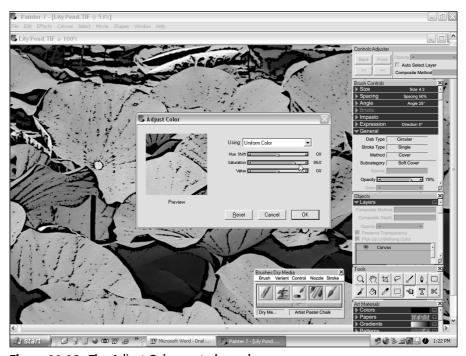
Figure 14-16: The Adjust Color control panel

11. Go to the File menu, and choose Clone.

This makes a duplicate of the original image and sets the original as the clone source.

12. From the Brush Palette, choose Dry Media/Artist Pastel Chalk.

Use the default parameters with the exception of changing the brush size to 4. You can experiment with different parameters on the brush to alter the effect.

13. On the Material/Colors Palette, check the clone colors option.

This tells the program to get its clone color information from the source image.

14. Go to the Effects Menu and choose Esoterica/Autoclone.

The autoclone starts running and changes the image onscreen. Autoclone keeps running as long as you let it. Keep an eye on the changes, and stop autoclone by clicking anywhere in the image at any time. If you don't like where it finished, select Undo, and run it again. You can experiment with different settings in this manner. One possible result is shown in Figure 14-17.
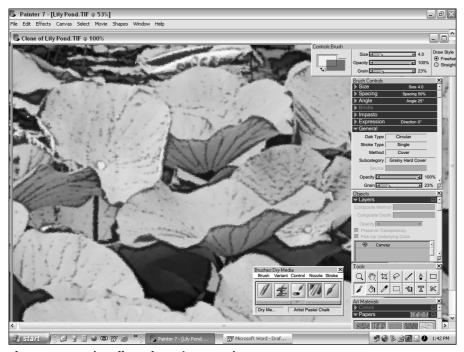
Figure 14-17: The effect of running Autoclone

15. Go the Materials Palette and choose Paper and a texture that you like.

In this case, I picked Hot Pressed Watercolor, as shown in Figure 14-18.
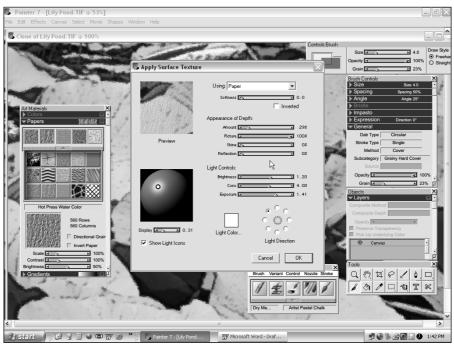
Figure 14-18: The Surface Texture control panel

16. Go to the Effects menu, and choose Surface Control/Apply Surface Texture.

The control window appears. I usually reduce the Shine to 0 and lower the Texture amount to make the texture subtle. You can experiment with various settings until you get the look you desire. My final result is shown in Figure 14-19.
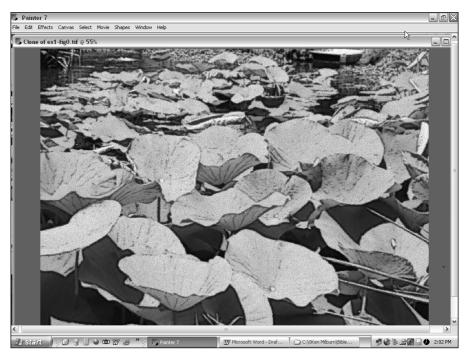
Figure 14-19: The final look

Stylizing a portrait

This exercise takes a straightforward portrait and adds painterly style. With the use of watercolor cloning brushes, you can add a soft painterly look to a portrait, which makes the image a prized possession and a nice addition to any album. The additional bonus is that this technique is easy to use.

1. **Open the file** Donna**, shown in Figure 14-20, from the CD-ROM.**

2. **Go to the File menu, and choose Clone.**

3. **Go to the Select menu, and choose All.**

   This sets the cloned file up for a tracing.

Figure 14-20: This photo is the starting point of this exercise.

4. Go to the Edit menu, and choose Cut.

5. Go to the Canvas menu, and choose Tracing Paper.

The clone source image is dimmed by 50%, as shown in Figure 14-21, so that you can trace over it.

6. Go to the Brush Palette and choose Pen/Fine Point.

You can use any drawing brush to trace with. I happen to like the pen for this image.
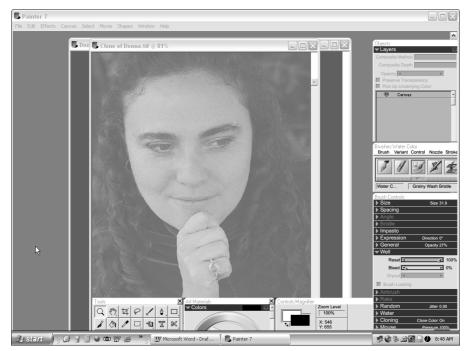
Figure 14-21: The Tracing layer with the clone source image dimmed

7. **Set the foreground color to black and trace the picture, as shown in Figure 14-22.**

   Once again, choose whatever color you want — it doesn't have to be black.

8. **When you finish tracing, go to the Brush Palette, and choose Watercolor/Grainy Wash Bristle.**

   I set the size of the brush fairly large, at 32, to get broad expressing strokes. Using the grainy attribute lets the paper texture show.
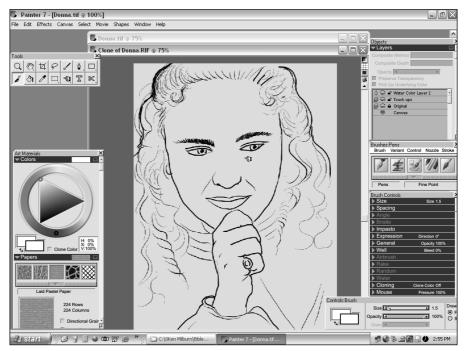
Figure 14-22: The traced image

9. **From the Materials Palette, choose Paper/Pastel Paper.**

   If you prefer a different texture, you can choose any of the presets or create your own.

10. **From the Materials Palette, make sure that the Clone Color option is selected**

11. Paint the image with the Watercolor Brush, as shown in Figure 14-23.

The colors and luminance information are picked up from the clone source image.
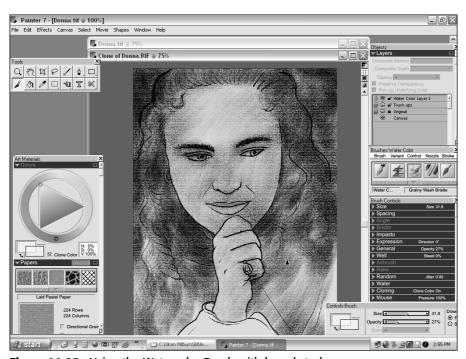
Figure 14-23: Using the Watercolor Brush with broad strokes

12. Use a Dry Media Brush to touch up the eyes and mouth with accent color.

13. Finally, use the Adjust Color from the Effects Menu to saturate the color, as shown in Figure 14-24.
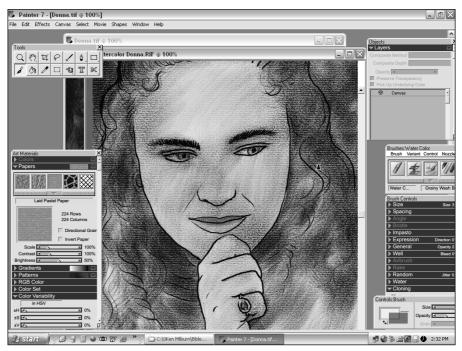
Figure 14-24: Boosting the color saturation gives it a more painterly look.

Creating a logo for a Web site

This exercise shows you how to make a quick, yet powerful graphic for a Web page. In this exercise, you use the Autoclone feature in conjunction with Artist brushes, which simulate historic painting styles. In this case, you use the Van Gogh style.

1. **Open the file** Rose**, shown in Figure 14-25, from the CD-ROM.**

2. **Use the Lasso tool to trace around the rose so that you can remove it from the background.**

   You can use the Alt or Shift keys to add or subtract to the selection to fine-tune it.

Figure 14-25: The source photograph

3. **After you have selected the rose, go to the Select Menu, and choose Invert so that the selection is switched to the background.**

4. **Go to the Select menu, and save the selection because you don't want to remake such a painstaking selection if you make a mistake.**

5. **In the Materials Palette, choose Color, and set the foreground color to black.**

6. **In the Effects Menu, choose Fill, which turns the background black, as shown in Figure 14-26.**

Figure 14-26: The background is filled with black to accentuate the rose alone.

7. **Go to the File menu and clone the image.**

8. **Make the cloned image the active window. In the Brush Palette, choose Artists/Auto Van Gogh.**

9. **In the Brush Controls Palette, choose Size and set it to 16, then choose Impasto and set it to Color and Depth with a depth value of 12.**

10. **Go to the Effects Menu and choose Esoterical/Auto Van Gogh.**

    This autoclone only runs once, unlike most autoclone functions. You can change the parameters and rerun this until you get the desired look, similar to the effect shown in Figure 14-27.

11. **Save the file as a GIF or JPEG file for the Web.**
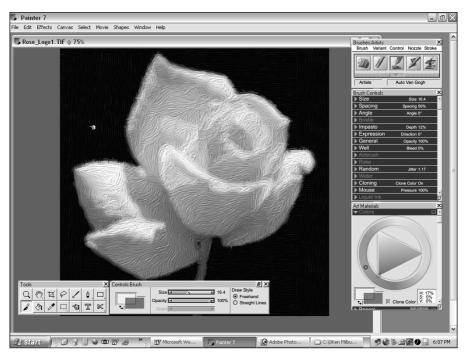
Figure 14-27: The effect of Auto Van Gogh autoclone

Fine art: the hands-on approach

This exercise gives you glimpse into the world of fine art photopainting, which draws more of its disciplines from the painting world, but is still closely tied to digital photography. This should give you some idea of how far you can push the photopainting envelope (if you want to) and that no strict rules exist regarding where you draw the line between photography and painting. I also want to demonstrate how you can use images from multiple image sources to create a composite to lay the groundwork for the painting. This process can transform a problem photograph into a marvelous painting. I am also going to break the rules a bit here, just to show that no rules exist, and I use both Photoshop and Painter for this exercise to show how it is sometimes more efficient to work with more than one imageediting program. I am going to do the image editing and composting in Photoshop and the painting in Painter.

The following steps are in Photoshop:

1. **Open the files** Summer1 **and** Summer2**, both of which are shown in Figure 14-28, from the CD-ROM.**
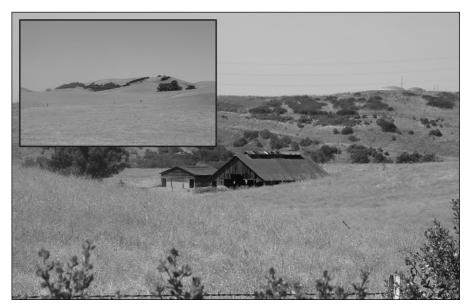
Figure 14-28: The two source images

2. **Make Summer1 the active window.**

I decided that I liked the midsection of the photo and that the elements in the foreground and background were not what I wanted. I liked the hills on the opposite side of the road, which you can see in Summer2. I decided to replace the background hills for the ones in Summer2 by using a layered compositing approach.

3. **Choose Filter ➪ Extract.**

The Extract dialog appears.

4. **Choose the Highlighter tool and cover the area that divides the hills from the rest of the image.**

I use the line of the lower hill in front as a natural separation, as shown in Figure 14-29.

5. **Then choose the Paint bucket tool, fill the area above the horizon line, and click the Preview button.**

Everything that was covered by the preview area will disappear. If you like the result you got, click OK.
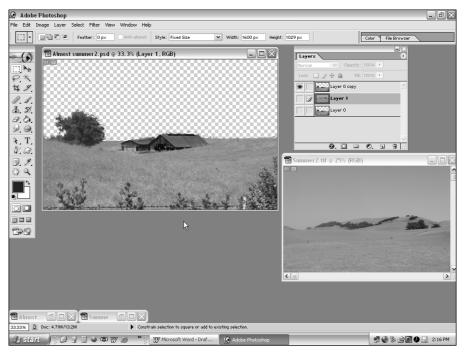
Figure 14-29: Extract the background

7. **Make Summer2 the active window, choose Cmd/Ctrl + A to select the entire image, and then Cmd/Ctrl + C to copy that image to the clipboard.**

8. **Choose the original image's window and press Cmd/Ctrl + V to paste the clipboard image, which will appear on its own layer.**

9. **Drag the new layer's Name Bar below the original image layer.**

   This places the new hills behind the barn, as shown in Figure 14-30.

10. **Adjust the position so that the composition is balanced.**
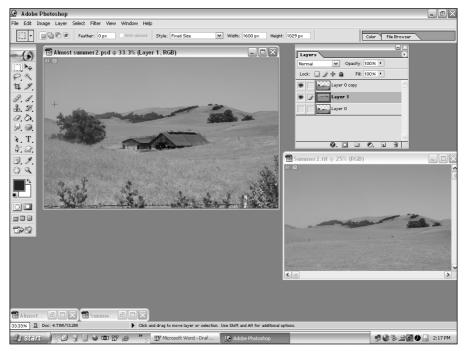
Figure 14-30: Composite of the two images with new hills in the background

11. **Next, use the Clone Stamp to eliminate the foliage in the foreground, as shown in Figure 14-31.**
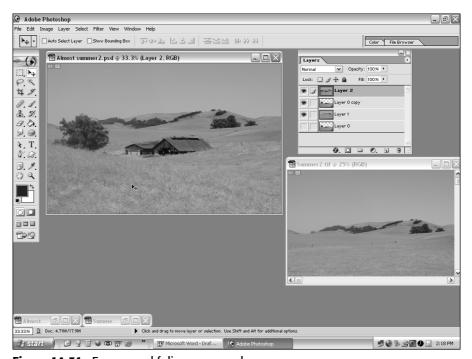
Figure 14-31: Foreground foliage removed

12. **Go to the Image menu, select Adjustments/Hue/Saturation, and set the saturation value at 50.**

13. **Save the file.**

The Next steps are in Painter:

14. **Use Painter to open the file that you just saved.**

Tip   This painting utilizes two brush types, the Impressionist brush and the Camel Hair brush. The Camel Hair brush is the type of brush that can pick up colors on individual bristles. To increase the effectiveness of this brush type, I often add a bit of noise to the image to increase the randomness of color pickup and add more variation. I use the Camel Hair brush on the grass areas and the Impressionist brush on the barn.

15. Go to the Brush Palette, and select the Cloner/Camel Oil Cloner brush.

You are now going to set this up to use as a mover type brush, not a true cloner. To do this, follow these steps:

   1. Set the Brush Control/Well/Resat value to 0 so that the brush uses only local color to resaturate the bristles.

   2. Check the Brush Loading attribute to activate it.

   3. Make sure Clone Color is deselected in the Art Materials/Color palette. This moves paint around on the canvas.

   4. If you want to add some of the foreground color as you move other colors, raise the Resat value a bit until you get the mix you want. I consider this to be the most natural way to paint on the computer because it simulates real brush control.

16. Next, set the Impasto level of the brush.

This achieves the thick paint look. Go to the Brush Control/Impasto/Depth and set to 12. Adjust this to your own taste after doing some tests.

17. Play around with the size of the brush to see how it works for different painting needs.

You may want the brush strokes in the foreground of the painting to be larger than in the distant fields to follow the rules of perspective.

18. Go to Canvas Menu/Surface Lighting/Shine and reduce it to 0.

This kills the shiny effect on 3-D strokes, which I find to look entirely unnatural, but if you want, by all means, leave it alone.

19. Paint the areas of the grass and barn.

20. Go to Brush Palette and choose Cloner/Impressionist brush.

Make sure that Well/Resat is 0, Brush Loading is selected, and Clone Color is deselected.

21. Go to the Brush Control Palette and choose Expression/Angle and set it to Direction.

This changes the brush strokes to move in the direction you move the pen.

22. Adjust your brush sizes to your liking and paint.

Your final product may resemble the image shown in Figure 14-32.
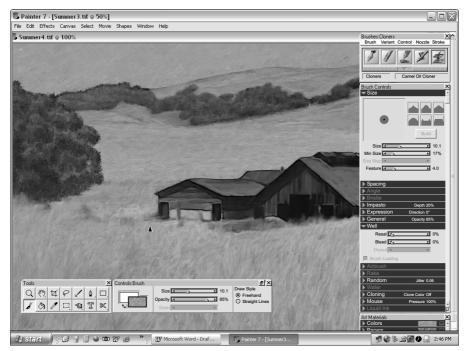
Figure 14-32: The final look after brushing over the entire picture

Adobe Photoshop 7

Adobe Photoshop has been the standard by which all other image editors have been measured for quite some time now. Photoshop did not excel in the area of painting — until now. Photoshop 7 has moved the application into a whole new realm of painting capabilities. It's not as robust as Painter 7, but the additions to this version are well worth taking a look at and are a welcome addition to all faithful Photoshop users.

History and Art History brushes

Photoshop comes with a long list of filters that can be used in photopainting. Photoshop includes the History brush and Art History brush, which expands the ability to use filters in conjunction with brushes. The History brush works with a function called the *snapshot,* which is like a clone. The snapshot freezes an image in time and saves it to another virtual file, which you can access from the History

window. You can save as many snapshots as you want and select them individually as a source image to use with either the History or Art History brush. Duplicating an image to many layers and applying different filters to each individual layer and then taking snapshots of each layer, gives you multiple sources to use for reference on the History brushes.

The Art History brush takes this concept one step further and is a new to Photoshop 7. This brush provides a set of parameters that you can set to make the brush alter the pixels from the snapshot as it draws. This is more like the cloning brushes in Painter, but nowhere near as diverse or complex. The History brushes work with some of the dynamic parameters in the new brush system in this version of Photoshop, which add another layer of capability on these useful painting tools.

Compositing

Compositing is an action you will perform a lot of if you get into photopainting to any depth, and Photoshop is the program to use. Combining multiple photographs without having to worry about seamless mergers or blends is a great freedom in photopainting. You can have a great deal of fun with this — once you get the knack. I demonstrate some techniques for doing this in one of the following exercises. The combination of the layering functions and the Clone tool makes for a powerful compositing combo.

The new brushes

For many years, I have heard the cry of Photoshop users. "Why don't they put some paint functions in this program?" For all versions prior to Photoshop 7, the same old brush types prevailed with only the addition of some pressure-sensitive pen options. For the most part, users got most of their paint capabilities from plug-ins such as Deep Paint, or they used other paint applications. The problem with this approach is the impact on workflow. Photoshop has the best methods for editing, color control, and compositing, so I avoid using other applications for these functions. When I'm photopainting, however, I'm constantly going back and forth between applications to get the best of both worlds. An application that provides all this functionality has been the Holy Grail of photopainting.

Finally, part of the answer has come in Photoshop 7. Although Photoshop still has room for improvement, this version is a major step forward and I think Photoshop users are going to love it. Unfortunately, the new brush types don't add much to any of the automated functions. You still have to look to plug-ins or other applications for that feature. Photoshop has not provided a capability such as the auto-clone feature that Painter offers. For now, Photoshop 7 offers significantly more than the previous versions, but it isn't a total paint system yet.

The new brush system in Photoshop 7 includes a whole new brush window with more parameters than you can shake a stick at. For the first time, Photoshop has a customizable brush. You can set a series of dynamic parameters for each brush that controls various aspects of the brush's behavior. These parameters include shape, texture, scatter, dual brush, color, opacity, and flow. In addition, you can select noise, airbrush, wet edges, smoothing, and protect texture, which can set basic characteristics, but don't have dynamic controls.

A wide array of preset brushes also come with the program; they are arranged into a number of selectable libraries for you to choose from. You can also create your own brushes and libraries. The brush tips can be any shape and you create them by capturing patterns from any image. The brush tip image works with an alpha map, using the gray scale to determine opacity base lines. One of the parameters, called Scattering, can multiply the tip image and randomly scatter it around the brush path, while rotating and sizing it, too. Many of the dynamic functions use a control called Jitter. *Jitter* is an oscillation function that causes the values of the brush characteristic to which it is attached to randomly move within a set range around the base value.

Another addition that is quite wonderful is the Texture parameter. This uses alpha maps of tiled texture images to determine highs and lows in the texture and how the paint flow will interact with them. You can create textures from any image. You can also use the Patterns Stamp tool in conjunction with the new brush parameters, which makes it much more interesting.

It is impossible to explore every nuance of these systems with so many interacting parts; you could take years to discover all the possible combinations, which is part of what makes them so attractive to artists. This kind of dynamic system provides a rich creative springboard for individual expression. Some applications have a look that can be identified in spite of the uniqueness of the artist working with them. Photoshop 7, however, provides a complex dynamic that is highly adaptable and definable by individuals.

Using filters and texture to simulate watercolor

This exercise gives you an idea of what it's like to use a combination of filters to achieve a natural media effect. When you develop your own methods, store them in action files so that you can run them in an automated mode. I find that this helps me remember the sequence and settings, even though I may still run each command one at a time.

1. **Open the file** `Sunflower1`, **which is shown in Figure 14-33, from the CD-ROM.**
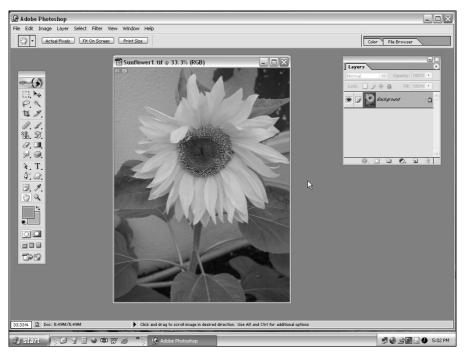
Figure 14-33: The source image

2. **Go to the Select menu, choose Color Range, and use the Add dropper to select the beige color wall in the background.**

3. **Go to the Image menu and choose Adjustments/Variations, and adjust the color to a dark green to blend with the foliage, as shown in Figure 14-34.**
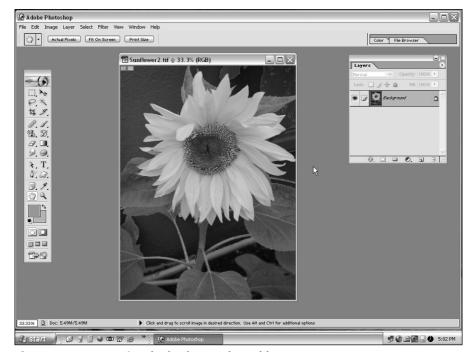
Figure 14-34: Resetting the background to add more contrast

4. **In the Layers menu, duplicate the layer.**

5. **Working on the new layer, go to the Filters menu and select Blur/Smart Blur and set the parameters for Radius 3, and Threshold 30.**

   Click OK to apply the filter.

6. **Go to the Filters menu and select Pixelate/Facet 3 times in row.**

7. **Go to the Filters menu and select Blur/Gaussian Blur. Set the parameter at 1.6.**

   Click OK to apply the filter.

8. **Go to The Filter menu and select Texturizer. Choose Sandstone with parameters at Scale 71, and Relief 6, as shown in Figure 14-35.**

Click OK to apply the filter.

9. **Duplicate Layer 0 and move it to the top-most position.**
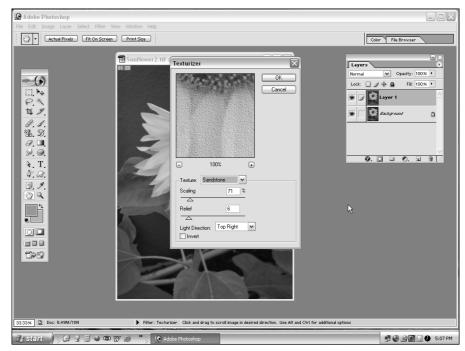
Figure 14-35: A series of blurs and then a texture to simulate bleed and paper

10. Go to the Filters menu, choose Stylize/Glowing Edges, and set the parameters at Edge Width 1, Edge Brightness 20, and Smoothness 15, as shown in Figure 14-36.

Click OK to apply the filter.
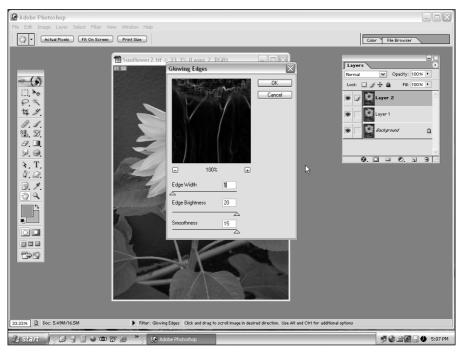
Figure 14-36: The Glowing Edge filter produces a nice outline effect when you invert it.

11. Go to the Image menu and choose Adjustments/Invert.

The inverted image is shown in Figure 14-37. Inverting the image ensures that no color artifacts occur.

12. In the same menu, choose Adjustments/Desaturate

Figure 14-37: The inverted image with color removed so no color artifacts occur

13. In the Layers window, change the Layer Attribute to Multiple.

Your final result should look like the image in Figure 14-38.
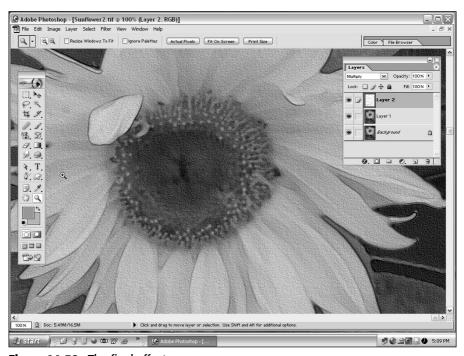
Figure 14-38: The final effect

Using History brushes to get a combination media effect

In this exercise, I demonstrate the use of the History brush and multiple filters. By saving the image with different filter effects to separate snapshots, I am able to go back in and selectively paint with any one of the snapshots. This is lot easier and more free flowing that trying to lasso areas and apply filter effects.

1. Open the file Lilies, which is shown in Figure 14-39, from the CD-ROM.

2. Go to the Filter menu and go to Distort/Ripple. Set it to 325, which will be used for the water effect.

Click OK to apply the filter.
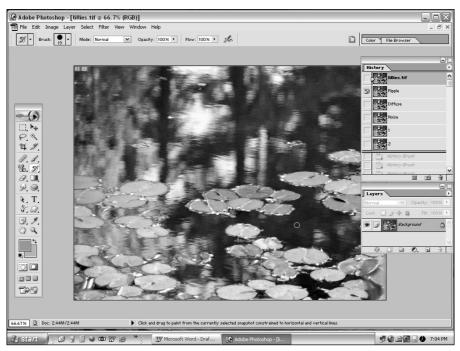
Figure 14-39: The source image

3. **Take a snapshot and name it Ripple.**

4. **Go to the Filter menu and go to Stylize/Diffuse. Run it 3 or 4 times to increase the effect. You will use this for the foliage.**

5. **Take a snapshot and name it Diffuse.**

6. **Go to the Filter menu and go to Noise/Add Noise. Choose Monochrome, set at 20, and click OK.**

   Noise is used to blend and add texture.

7. **Take a snapshot and name it Noise.**

8. **Go to back to the original snapshot. You will use this as a start point to begin brushing in effects.**

9. **Select the History brush. Set the size at whatever you are comfortable painting with. You can always change the size to get into tight areas.**

10. **In the History window, select the Ripple as a source.**

11. **Begin painting in the water areas and you can see the ripple effect appear, as shown in Figure 14-40.**

12. **Next select Diffuse as a source.**
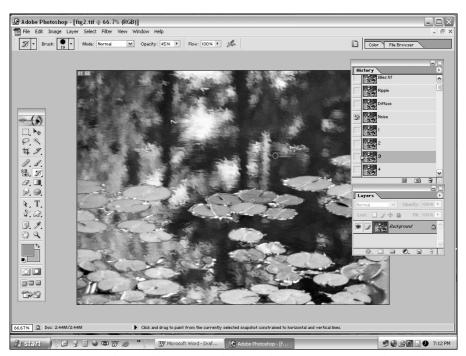
Figure 14-40: Brush over the water and the ripple effect is transferred from the snapshot.

13. **Paint in the water lilies and background foliage. Now the water lilies and the background foliage take on the diffuse texture, as shown in Figure 14-41.**
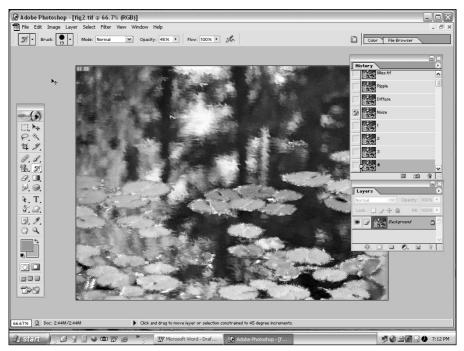
Figure 14-41: The water lilies and the background foliage have a diffuse texture.

14. **Finally, add Noise at 50% opacity to make it subtler and just touch up areas as needed. Voila! The next Monet is seen in Figure 14-42.**
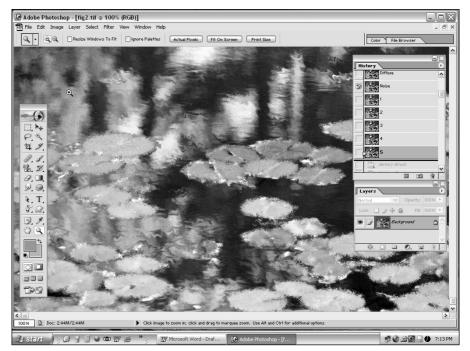
Figure 14-42: The final photopainting with a wonderful mixture of textures

Brushing up the Background

In this exercise, I put an airbrushed background on a portrait. Photographers often capture a good image of someone, but the background leaves something to be desired. Photopainting makes it easy to create an artificial environment and make the photograph into something special.

1. Open the file Eden, which is shown in Figure 14-43, from the CD-ROM.
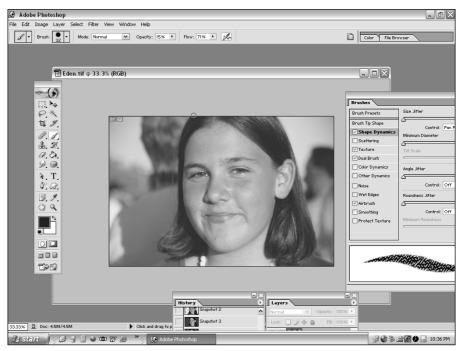
Figure 14-43: The source image

2. **Go to the Image menu and select Adjustments/Auto Color.**

   This automatically adjusts for optimal color balance. Sometimes this works well and sometimes not; you just have to give it a try.

3. **Now knock out the background with a tool called Extract. Go to the Filters menu and select Extract.**

4. **Outline the head with the Pen tool, as shown in Figure 14-44, and hit Preview.**
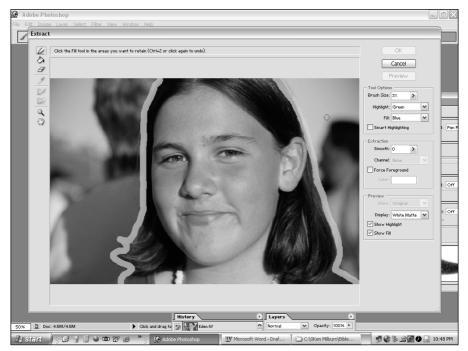
Figure 14-44: Using Extract to remove the background

5. If it looks acceptable, then click OK. If not, adjust the settings and try it again until the preview is satisfactory.

6. Duplicate that layer and create a new layer beneath it.

7. Fill the layer below with a medium gray blue or any color you like in a mid-range, as shown in Figure 14-45.

8. Open the Brush window, select a round brush, and enlarge it to over 100.

9. Select the airbrush option.

10. Check the Texture Dynamic and select a texture that you like.

11. Check Other Dynamic and set the control for Pen Pressure if you are using one.
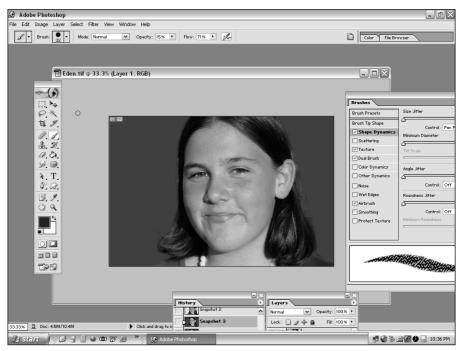
Figure 14-45: Fill the background with a mid-range color.

12. **Select a color that is a few shades lighter than the color you filled the background with.**

13. **Make sure that the opacity for the brush is set fairly low, around 15%, and that the flow rate is higher.**

    Experiment with these settings until you get it to match the way you work.

14. **Airbrush the background, easing your strokes as you move away from the head to create an airbrushed gradient.**

15. **Next, choose a color a few shades darker than the fill color and start at the outside and airbrush in, blending as you go.**

    The final result is similar to the one shown in Figure 14-46.

Figure 14-46: A much more dramatic portrait

Other applications of interest

When evaluating software, be aware that when you see software listed in catalogs, on the Web, or in a magazine as an advertisement, the company always puts their best face forward and never talks about weak points. Therefore, you need to see what the software really can do, not what the makers say it can do.

Also, you usually get what you pay for. If a program costs under $100, it's probably not a professional level application. You may find very specialized programs or filters with prices in the $100 range, but you won't find full-blown editors and paint programs in this range. Whenever you can, look at output samples or download a demo so that you can see the real capabilities. You may be surprised how much the actuality differs from the hype.

If you can locate reviews, they can be a good source for more in-depth information, but I caution you here. I have found reviews to be misleading and have often wondered if they were impartial in many cases. The best barometer for software is you taking a direct look at the real thing. Many companies offer limited time demos and I suggest you take advantage of this offer. You can save yourself a lot of time and money if you take the time to check it out!

Adobe Elements

Adobe Elements is an incredible value. Remember that rule about getting what you pay for? I don't know what the folks at Adobe were thinking, but this is a steal. Elements is basically a fully functional version of Photoshop without the professional level color and production tools. If you don't need production level software, Elements gives you the full capability of Photoshop plus a few extras that make it easier to use. The really nice part is that the price is very affordable at $99. This is definitely one to check out. Find out more about Elements and other Adobe products at www.adobe.com.

Adobe ImageReady

Adobe ImageReady was designed to work alongside Photoshop as a Web graphic optimization application. ImageReady has a complete set of tools to cover every aspect of image editing, animation, color conversion, file conversion, and optimization.

Adobe PhotoDeluxe

PhotoDeluxe is designed with the amateur, home user, or hobbyist in mind. It has many built-in routines that are designed to be easy to use. They take the user through step-by-step processes to achieve a certain result. This program is great for those who want to work with their snapshots to touch up, enhance, and modify their photos in basic ways. You can create projects for creating greeting cards, calendars, photo albums, and so forth with simple templates. The program comes with simple templates and clip art. It is not designed for professional level editing, however.

ArcSoft PhotoStudio

ArcSoft PhotoStudio is a capable photo-editing program in the same style as Photoshop. This program was designed specifically to edit photographs and has a full lineup of editing tools including stitch, red eye removal, layers, undo, image management, editable text, batch processing, and more. Find out more about PhotoStudio and other ArcSoft products at www.arcsoft.com.

buZZ

This program is a newcomer in the arena of Photoshop-compatible plug-ins, but don't let that stop you from getting this one. It is a gem. A company called Segmentis out of the United Kingdom produces buZZ. The program is comprised of a number of routines that you can run alone or in series. The effects change as you add more routines or change their order. Many of these routines have separate controls.

The mainstay of the program's set of routines is called *simplifiers.* This is ideal for photopainting because their purpose is to average out the details to more generalized shape and color. The effect is outstanding and in many instances, can stand on

its own with no further work. You can see the result of using nothing but the simpli-fiers in Figure 14-47. The other routines are nothing extraordinary on their own, but they can produce some wonderful results when combined together. Find out more about buZZ and other Segmentis products at `www.segmentis.com`.

Figure 14-47: The buZZ plug-in using the simplify routine

Color It!

Color It! 4.0 from MicroFrontier, Inc. is a full-featured image editor with a wide array of features designed to handle many aspects of image editing and Web graphics. Color It! supports Photoshop compatible plug-ins and boasts a large selection of built-in filters. Color It! can build animated GIFs and Web image maps and it can even do color separations. Color It! was designed to work with relatively small amounts of RAM. 128MB is more than adequate unless you're working with large images, which makes a good choice for home users. Find out more about Color It! and other MicroFrontier products at `www.microfrontier.com`.

Deep Paint

Deep Paint is a paint program from Right Hemisphere. Deep Paint serves as both a Photoshop plug-in and a stand-alone application. It is a wonderful add-on for Photoshop because it does just about everything Photoshop doesn't. Deep Paint uses a similar paint system to Painter in that it can also create pseudo impasto, uses clone brushes, and has a wide array of natural media tools. Deep Paint has one of the largest collections of preset brushes I have ever seen and lot of them are pretty wild. I was also impressed with the performance of some of the brushes. If you don't want to invest in an expensive paint program to augment Photoshop, this is a very good choice. Deep Paint also has very powerful brush cloning capabilities, as you'll see if you check out Figure 14-48. Find out more about Deep Paint and other Right Hemisphere products at `www.us.righthemisphere.com`.

Figure 14-48: Deep Paint's brush cloning capability

Expression 2

Expression 2 is being produced by the original developers, Creature House. Expression is a rather unique product that is ideal for professional graphic artists who need precise control over their elements. Expression uses a system of skeletal strokes to control bitmapped images, meaning that the pixel alignments

are controlled relative to a vector path, which is how most complex brushes work. Expression is unique in that the vector paths are editable, so you can precisely adjust the orientation of a very loose image. This program also does a lot of work with alpha channels and transparency options. Expression was made to fill some niches that need filling. In addition, it's loaded with some professional level color management and editing tools. Find out more about Expression 2 and other Creature House products at www.creaturehouse.com.

Jasc Paint Shop Pro 7

Paint Shop Pro is a solid paint package that has been around for a while. Paint Shop is trying to be an all-in-one package with tools for drawing, painting, special effects, Web page production, digital image editing, and photo enhancement. You may wonder how they can put this all in a program that costs only $99. If you are looking for a one-stop shop, and you aren't looking for a truly professional level application, then Paint Shop Pro may fit your bill. Find out more about Paint Shop Pro and other Jasc products at www.jasc.com.

MGI PhotoSuite 4

PhotoSuite 4 is targeted at the amateur user. It has a series of tools to capture, edit, and manage digital photos with an easy-to-use interface that is modeled after a Web browser with menus along the side. PhotoSuite 4 includes project templates, stitching, and Web graphics support. The latest version leans heavily to the Web production side and provides many tools to support that activity. Find out more about PhotoSuite 4 and other MGI products at www.mgisoft.com.

Micrografx Picture Publisher 10

Picture Publisher 10 is a straightforward professional level image editor along the lines of Photoshop. It includes a robust color management system along with special effects, wizards, and macros. Picture Publisher 10 is designed to give you output to any platform, including photographs, production ready art, and Web graphics. Find out more about Picture Publisher 10 and other Micrografx products at www.micrografx.com.

Microsoft Picture It!

This is a nifty little package from Microsoft. Picture It! is another program aimed directly at the amateur or home user who wants to take advantage of all those digital photos they are taking these days. It takes the wizard approach to image editing and photo projects by providing lots of templates and guided processes for common image-editing tasks. Picture It! provides an easy interface for capturing, managing, editing, and finally posting your images to the Web or printing them. This program also comes with lots of art, special effects, and projects, along with tutorials to help you learn about image editing. Find out more about Picture It! and other Microsoft products at photos.msn.com.

Studio Artist

Studio Artist was developed Synthetik. It is a more recent entry into the paint software market. Their approach is to leave the painting to the computer. If you're looking for an automated system for natural media and other effects, this is one to look at. The program uses a complex system of image analysis and then synthesizes a new image based on parameters that you pick from an extensive list. You can play with this all day and never scratch the surface of how many styles it can produce. This process is similar to the autocloning feature of Painter, but on a higher level. The downside is you really can't get the subtle detail of human interaction with the brush itself. One thing that is unique about this program is its capability to apply these filters to video frames, turning them into rendered QuickTime movies. You can produce some interesting animations. This is a wonderful tool for the untrained artist. Studio Artist retails for over $300, and is currently only in Macintosh format, but a Windows version is planned. Find out more about Studio Artist and other Synthetik products at `www.synthetik.com`.

Ulead PhotoImpact

PhotoImpact is another want-to-be-everything package that has aimed its sights at the illustrator market. It has a good ability to composite vector and bitmapped graphics together. You will find an extensive set of tools for Web production including GIF animations, Java Scripts, slicing, image mapping, color conversion and much more. PhotoImpact is a solid package. Find out more about PhotoImpact and other Ulead products at `www.ulead.co.uk`.

Ulead Photo Express 4

This application is along the same lines as Microsoft's Picture It. Photo Express was designed to be a quick and easy solution to amateur digital picture editing and production. This application takes you from image capture all the way through to Web production, providing everything you may possibly need along the way. It is a great home-use product.

Xaos Paint Alchemy

Paint Alchemy is another Photoshop-compatible plug-in with a click-and-paint approach to natural media and other effects. Its easy-to-use interface, which is shown in Figure 14-49, is packed with adjustable parameters that can be used to change the attributes of the automated brushes. The program comes with an expansive list of preset brushes and in addition, you can customize brushes of your own. Paint Alchemy is not subtle, but you can get some stunning effects. When used in conjunction with layers and the History brush, it can be a useful addition. Find out more about Paint Alchemy and other Xaos products at `www.xaostools.com`.

Figure 14-49: The Paint Alchemy interface

Post-printing Painting Techniques

This is another area of photopainting that is less well known. Artists use a number of techniques to expand photopainting beyond the virtual environment. Many artists use the photopainting process to create an image that can be overpainted using conventional media paintings in oils, acrylics, and mixed media. Because photopaintings can be printed onto many substrates, including canvas, it lends itself to this process. The underpaintings are usually done in monotones and act as a luminance map for the painting. This technique closely allies itself with the Flemish style of painting that made extensive use of monotone underpaintings as a start point. The advantage of using the computer is that it's a flexible environment in which to integrate images and experiment with numerous compositions before committing to canvas. Other artists draw or paint over full color output to develop a mixed media approach. This process can be as simple as retouching or extensive modifications and additions with ink, paint, pencil, and so forth. Let your imagination fly. Untried techniques are popping up everyday and it is clear that we have only seen the beginning in this new medium.

Summary

This chapter covered a number of techniques for transforming photographs into abstracted images that make us think more of traditional paintings (even though the style may be extremely modern) than of photographs. The examples that I used highlight when it's best to work in an image editor such as Photoshop 7 as opposed to a program, such as Painter, that imitates the use of natural media. Finally, I provided a list and description of other tools that are frequently used for creating all or part of a photopainting.

✦   ✦   ✦

The Versatility of Digital Photography

Part V is where I describe all sorts of things that a digital camera can do (you may not even know some of them). I begin with a chapter that is an exhaustive discussion of all the ins and outs of making Web graphics for every purpose. If one of these topics needs further explanation, I take you through the procedure step by step. The next chapter is a grab bag of software that does a variety of cool tricks. This chapter covers everything from automatically making scrapbooks and Web portfolios to making panoramas for Web exhibition and movies for presentation.

Prepping Images
for the Web

When you begin to prepare digital photos for publication online, the first thing you need to think about is download time. In other words, ask yourself the following questions:

✦ What image format will best show the type of image I want to publish?

✦ What are the minimum dimensions that will show this file effectively?

✦ Can I get away with using a very limited range of color?

✦ Do I need to remain faithful to the original image?

This chapter explains how to optimize the look and performance of graphics — especially photographs — before placing them on a Web page. If you expect your photography to make a contribution to the professionalism and performance of a Web site, you have to know how to make graphics load as quickly as possible while simultaneously preserving all the necessary color and tonal range; this process is called image *optimization*. The specific steps that you need to take in this process differ from image to image. Optimization varies, depending on whether the image is a full range photograph or limited spectrum illustration; whether the graphic is to be a headline, link, page illustration, or inset graphic; and how important fidelity is to the original image.

Unless you don't care how fast your Web pages load, you should purchase a Web-specific plug-in for exporting your images to GIF and JPEG formats, or purchase a stand-alone program dedicated to that purpose. The professional versions of Photoshop come with a built-in image-editing program called ImageReady, which is a full-featured and very powerful program designed to perform image editing and presentation tasks that are specifically useful on the Web.

Tip   ImageReady is a very capable tool for making animations from photographs in a variety of ways. This animation capability also makes it a very useful tool for creating QuickTime animations for use in presentations and multimedia CD titles.

Massive amounts of information must be posted to many sites every day. If you have hundreds of images to process every day, I recommend DeBabelizer, which can totally automate this process for you.

Cross-Reference   Chapter 16 offers more specifics on what DeBabelizer can do for you.

The focus of this chapter is the preparation that is necessary before deciding what size, format, and software you need rather than the software that you use to do the job. At the very end of this chapter, I show you some of the more commonly used processes for prepping Web images for a variety of purposes.

Optimizing an Image in Photoshop Elements

One of the quickest and easiest ways to optimize images for the Web is to use the File ⇨ Save for Web command in Photoshop Elements, which brings up a simplified version of the Save for Web dialog box in Photoshop Professional. The chief difference between the two program commands is that in Photoshop Elements, the various settings options are reduced to those most popularly used. More importantly, you can't simultaneously preview multiple versions of the commands. However, you can instantly compare the results of any settings changes to the original before you make your final choice concerning how to store the file to then be served up on your Web site.

Follow these steps to optimize your image:

1. **Duplicate your image.**

2. **You may want to flatten your image.**

3. **Size your image for the Web.**

4. **Adjust the colors.**

5. **Choose File ⇨ Save for Web.**

   The Save for Web dialog box appears, as shown in Figure 15-1. If your image is quite small, you can probably save it as a dithered GIF file with a limited number of colors, which ensures that the image looks acceptable on a wide range of monitor systems.
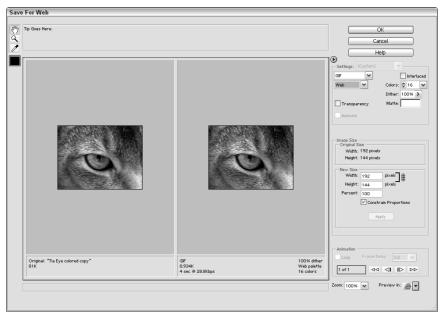
Figure 15-1: Compare the simplicity of the Elements Save for Web dialog box to the Photoshop 7 version shown in Figure 15-2.

6. Choose GIF from the Optimized file format menu.

Notice that the other choices for options change with the file type that you choose.

7. Leave the Specify the amount of dither slider at 100%.

This action intermingles the colors of individual pixels to create the illusion that you are seeing a wider range of colors than is actually the case.

8. Experiment with the number of colors.

Notice that the number of available colors is pre-set to Automatic. If you leave this option alone, Photoshop Elements automatically chooses the smallest number of colors it deems necessary to satisfactorily interpret the picture. I suggest that you find out for yourself. You'll learn more as you go and you can maximize your accuracy.

9. From the Maximum number of colors in a color table menu, choose 128.

If the picture still looks good, choose 64. Keep reducing the colors in this manner until the picture suddenly looks pixilated and the colors seem to flatten out. When this happens, back up to the next highest color.

10. Keep your eye on the statistics under the right window.

When it shows the smallest file size consistent with a decent-looking optimization result in the preview window, click OK.

In Photoshop 7, you can follow one of two paths that lead to a very similar interface for optimizing Web images. You can do all of your image editing in Photoshop and then choose File ➪ Save For Web, or you can take your image editing as far as you like in Photoshop, and then click the Jump To button at the bottom of the Toolbox and complete your optimization in ImageReady. At this point, you get an interface that is virtually identical to that in the Save For Web dialog box. (See Figure 15-2.) In either case, this interface allows you to view multiple versions of the optimization settings before you save the file. Being able to preview multiple versions is a major time saver. Otherwise, you have to guess at the best compromise between the degree of compression, the number of colors, whether or not the image should be compressed, and so on.
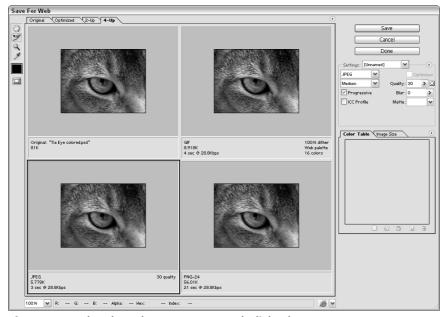
Figure 15-2: The Photoshop 7 Save For Web dialog box

Enhancing your Web Pages with Photographs

If you want your pages to hold the attention of your site's visitors, you must use graphics of some kind. Photographs are a good choice for these graphics for several reasons:

✦ **Credibility:** If your site is a commerce or information site, and you need to show viewers your merchandise or what a crime scene actually looks like, a photo is the most credible type of illustration. Even though it's totally untrue in this digital age, the public perception is that the camera never lies.

✦ **Speed:** Even if you digitize your photos from analog prints or film, you'll find that it takes less time (especially if you don't have a competent artist on staff) to produce a professional-looking photo than it does to produce a professional-looking illustration.

Note Making pictures for the Web is one of the easiest ways to justify the purchase of a digital camera. Most of today's consumer and prosumer digital cameras produce four times as much resolution as you want for a Web graphic and you waste no time waiting for the pictures to come back from the lab.

✦ **Capturing the moment:** If either the primary or secondary purpose of your site is to provide news, then using photographs is imperative. A photograph is simply the best way to capture a moment in history.

✦ **Showing detail:** If you need to show your audience detail that's critical to the understanding of the subject, there's simply no better medium than photography. This is particularly true of medical journals and other scientific reporting.

✦ **Grab attention:** Attention spans are significantly shorter when people are looking at a monitor or TV set than when they're looking at a printed page. If they don't get the picture right way, they simply move on to a more captivating site. Another possibility for attracting attention is converting layered photographs to animated GIFs, which can be done automatically by several image-editing programs.

Graphics can also lend color and texture to your backgrounds, give emphasis to important points, make logical divisions for page content, and call attention to advertising on your site—all of which can make a big difference to your company's bottom line. In short, adding graphics to your Web pages is the easiest way to make readers pay attention to you—at least as long as the graphics load quickly and look good.

Tip Another reason that professional photographers should know about Web image preparation is that a lot of business is available in the Web photography field. Excellent photographers make excellent money doing Web photography exclusively.

I debated how much information to include in this chapter about nonphotographic elements. After all, this book is about digital photography — not about page layout and design. However, I doubt that a single reader of this book deals strictly with photographs. At the very least, you should know enough to be aware of some of the alternatives, as well as when you may want to use a photo in place of a more traditional type of graphic, such as a divider bar or navigation icon.

Alternatives to Using Photographs

Understanding how to effectively use photos on the Web is to also understand when *not* to use them. In many cases, it's more effective to use a bit of clip art or to draw an image than to use a photo. Photos are always bitmaps, and they are almost always true-color, so they require 24-bits of information for each pixel in the image. This means that the file size for a screen-size photograph, even when compressed, can easily be half a megabyte. If the image you need can consist of geometric shapes and flat colors, you can create a vector-based image that can display at one-tenth that size. Needless to say, that file will load to a Web browser a great deal faster.

Bitmaps

The GIF and JPEG files that are now the standard Web picture formats are bitmapped graphics. Bitmaps received their name from the fact that a digital picture is made by coloring each pixel individually. For example, imagine a mosaic tabletop. Each tile is in a particular place and is a particular color. Make the picture bigger and you still have the same number and size of tiles — they're just bigger and spread farther apart. This is why bitmapped images get rough looking (often called *jaggy, blocky,* or *pixilated*) when you zoom in on them. You can't make the picture dimensionally smaller without losing quality, either. Think about it: The only way to make the picture smaller is to throw away pixels (or tiles, in the mosaic metaphor). The result is less definition in the image. Even worse, the computer doesn't know which pixels are most important to the shapes in the image. It throws out as many tiles in a pattern as necessary to achieve the target size.

The most notable problem with bitmaps is file size. Because pictures are comprised of individual pixels, it is necessary to store several bits of data (24 bits per pixel for 16 million colors) for each pixel in the picture. Therefore, to make file sizes small enough for pictures to load into a Web page within a reasonable amount of time, it becomes necessary to make as many compromises in image quality as possible. This means minimizing both the number of pixels in the image (color palette reduction) and the amount of data used to describe each pixel (compression).

Tip   If you need to change the size of a bitmapped image, you'll get the best results when you can multiply or divide the original size by an even number. The software can then guess more accurately which lines and edges to leave in and which to ignore.

Vector graphics

Vector graphics are resolution-independent, which simply means that no matter how big or small you make the image—and no matter how many times you increase or decrease it's size—the image is always reproduced at the maximum definition allowed by the device on which it is displayed. Furthermore, it is possible to create a highly detailed advertising illustration on a computer with marginal screen definition and very little memory, and then have that image reproduced as a freeway billboard and still maintain smooth lines and fills.

How is this possible? Vector images are stored as mathematical (more precisely, geometrical) formulas. Each shape in the image is a complete formula, known as an *object*. Because objects are self-contained entities, it is easy for the computer to specify changes to that object and its relationship with other objects in the image. These changes never affect the quality of other objects in the image. The other important feature of vector images is their small file size, which results from the fact that images are stored as formulas. Remember, it makes no difference whether a circle represents something as small as a microbe or as big as the Earth. All the information necessary to describe the shape, color, line thickness, and other geometrical components can likely be stored in the same amount of space as a paragraph of text.

Just to keep things in perspective, vector graphics are not always the most efficient way to communicate an image. They are well suited to drawings, diagrams, logos, and other simple and clean shapes, but they are useless for displaying the tiny details and wealth of continuous tones that photographs convey.

Web graphics file formats

The task of choosing which graphics file format to use on a Web site used to be easier because you had half as many options as are available today. The GIF format was the only accepted format. The demand for photographic-quality color has since caused the JPEG format to be nearly as widely accepted. Now the question is, which format is best under what circumstances?

You can choose from four Web-compatible graphics file formats:

✦ **JPEG:** This format is visible to almost all Web browsers. JPEG is a true-color format that uses variable lossy compression to reduce file size. This format doesn't support transparency (alpha channels) and can't store images in a lossless format. JPEGs can't be animated, either.

✦ **GIF87a and GIF89a:** These formats use lossless compression and are limited to 256 colors. They are best suited to hard-edged, flat-colored art such as symbols, text, and info-graphics. GIF89a enables the designation of one color as transparent and permits multiple images to be stacked in one file, which can then be viewed as an animation and has become known as an animated GIF.

✦ **PNG:** A third bitmapped file format, designed especially for network graphics, is PNG (pronounced *ping*). PNG (Portable Network Graphics) is a new format intended to be a patent-free replacement for GIF, but the format is just being incorporated into the most recent generations of browsers. Otherwise, you need a plug-in to see PNG. PNG is actually available in two file formats:

• **PNG-8:** PNG-8 can interpret 256 colors and is an alternative to GIF.

• **PNG-24:** PNG-24 can interpret 16.8 million colors and is an alternative to JPEG — except that you can have transparency in a PNG-24 file so that the image can have an irregular shape that "floats" on the page.

Since the publication of this book's first edition, both Internet Explorer and Netscape Navigator browsers now include the ability to display PNG files.

Knowing which format to use in order to achieve a particular goal is a matter of keeping a few "rules" in mind. The following sections explain how to match each of these formats with the job.

GIF

GIF (Graphics Interchange Format) is the Web's most useful and most widely used graphics file format, and it comes in two flavors: GIF87a and GIF89a. For static, rectangular pictures, both types are fully compatible with all graphical Web browsers. In fact, the specifications for a rectangular still image are the same for both formats. All GIF files are restricted to 256 or fewer colors. They are compressed at an average ratio of about 3:1 over a noncompressed image of the same size and number of colors. GIF is better suited for storing images that contain mainly flat tones because its compression technology works most efficiently when the image consists mainly of patterns made by adjacent areas of solid colors.

GIF is the file format to use when a graphic has the following characteristics:

✦ It is composed of geometric shapes filled with flat colors.

✦ The original contains 256 colors or less.

✦ It is small (fits within a 150-pixel square).

✦ It is irregularly shaped (think of a triangular traffic sign).

✦ It is intended as an animation not dependent on programming or special browser enhancements.

The original GIF format, GIF87a, was restricted to rectangular, static images. However, people wanted a way to make images appear more quickly and to spare viewers from having to stare at empty placeholders. GIF89a, the more recent standard, overcomes these limitations by adding three enhancements:

✦ **The capability to recognize a single designated color as transparent.** Transparency makes it possible to create irregularly shaped graphics. such as vignettes, buttons, and icons.

✦ **The capability to store and display multiple discrete images in the same file.** This makes it possible to create auto-playing "flipbook" animations and miniature slide shows.

✦ **The capability to interlace images.** Interlacing enables the image to load in several stages of resolution. Interlacing creates the illusion that graphics (and, therefore, whole pages) load more quickly, thus giving readers a chance to see a "fuzzy" but recognizable image quickly enough to know whether to wait or move on.

Saving your file to GIF format is easy, provided it is already in a bitmapped or *rasterized* form. If your file is not in this form, first convert it to Indexed Color mode, which you do in Photoshop by choosing Image ➪ Mode ➪ Indexed Color. After the file has been converted, open the original file in any image editor, such as Photoshop, Painter, PHOTO-PAINT, or Windows Paint. From the main menu, choose File ➪ Save As. When the File Save dialog box appears, open the drop-down list of file types and choose GIF or CompuServe GIF.

On the other hand, you can almost always do a more efficient job of saving files to GIF format with a program dedicated to Web graphics, such as Adobe ImageReady or Macromedia Fireworks 2. If you don't want to make the investment in either of these programs, which retail for around $100 each, you can use a plug-in such as HVS GIF or Boxtop Software's PhotoGIF. These programs do as good — or better — a job for half the price, but they aren't as versatile as the Web image-processing programs that can save to GIF, animated GIF, JPEG, and PNG and don't have as fancy a user interface. Nor, for the most part, can they do other Web-specific chores, such as GIF animations, image slicing, or Javascript rollovers, which are discussed later in this chapter. Conversely, the plug-ins enable you to keep working inside your favorite Photoshop plug-in-compatible, image-processing program.

If your image-editing program has layers, then you can use them for "onion-skin-ning" a GIF animation. That is, you can put each frame on a separate layer. Then you can temporarily set the exposure controls for each layer so that you can also see the objects on the layers above and below a given layer, thus enabling you to scale and position the layer relative to its neighbors. This technique is helpful when creating a smoother illusion of movement. After you have positioned all the layers correctly, simply drag the contents of each layer into a frame in a GIF animation program. Photoshop's ImageReady can automatically interpret layers as animation frames.

Note   Numerous utilities, which are discussed in later sections of this chapter, enable you to create GIF animations.

If you are planning to save to GIF format, then you should understand the possibili-ties for — and ramifications of — color reduction. GIF files that have fewer than 256 colors can be stored at any bit depth from 1 to 8. The lower the bit depth, the smaller the file size and the faster it will load. Because the Web is a low-resolution medium as compared to print, you can often employ tricks to fool the human eye into seeing more colors than actually exist. The most important of these tricks is covered later in this chapter.

JPEG

JPEG is the file format in which to save your graphics if they are full-color, continu-ous-tone images (such as photographs) that are larger than approximately 150 pix-els square. The JPEG graphics file format gets its name from the committee that originated it — the Joint Photographic Experts Group. JPEG is a 24-bit, true-color file format that uses a variable lossy-compression algorithm. *Variable* means that you can choose just how much data loss that you want to incur in exchange for smaller file sizes.

When you save a file in JPEG format, you are given the choice of a range of com-pression levels. The higher the compression, the less faithful the image is to the original. Given the Web's resolution (typically 72 to 96 dpi), most of the typically tiny images used on the Web appear quite similar to the originals at the highest and lowest levels of compression. However, because colors vary so much from photo to photo, you need to be able to inspect the image before you save it in order to ensure that you won't get any ugly surprises. At maximum compression, a JPEG file is typically $\frac{1}{100}$th the size of the original.

A more recent variation on JPEG is *progressive JPEG* (pJPEG). Like interlaced GIF (iGIF), pJPEG enables the image to load faster in stages of increasingly higher reso-lution. The difference between a pJPEG and an iGIF is that the former permits a full range of color (24 bits per pixel versus 8 bits per pixel for iGIF). However, only recently have common image editors enabled you to save a pJPEG.

How do you save your files to JPEG? As with GIF, most modern image editors or paint programs handle the job. You can also use one of several standalone utilities to convert files from various bitmap formats to pJPEG.

Note   The Macintosh PICT file format, once the most common Macintosh format (these days, folks tend to use cross-platform formats such as GIF, JPEG, PNG, and TIFF), enables you to use JPEG compression when saving a file without actually converting the PICT file to a JPEG file. However, neither the Web nor any program expecting a JPEG file will recognize this PICT file as a JPEG file. When choosing the file type, be sure to pick JPEG, not PICT. PNG format also gives you the option of using JPEG compression. However, as with PICT files, a browser that doesn't recognize PNG files won't recognize JPEG-compressed PNG files as JPEGs.

PNG

Hopefully, the PNG format will become ubiquitous, because it supports both indexed and nonindexed color. (See the following section for more information on color modes.) PNG also supports high (but lossless) compression and transparency. PNG's transparency is vastly better than GIF because it is accomplished through an alpha channel, which makes it possible to have partial transparency. This means that PNG can provide a way to have drop shadows and vignettes for irregularly shaped graphics without halos — even on patterned backgrounds. If your Web site is designed for an *intranet* (a private or corporate Web with restricted access) whose readers use a single browser that supports the format, you should be using PNG already.

Your image-processing program can't be more than one generation old in order to save or export your files to PNG format. Most current versions of image-processing programs can open and save PNG files. Programs that save to PNG format vary a great deal as to which PNG attributes they support.

Understanding Color Modes

Three kinds of color "modes" are in popular use for Web graphics:

✦ Indexed-color

✦ High-color

✦ True-color

These modes are known by both their names and by their color depth, so if you hear one term or another, realize that they're synonymous. *Color depth* is the number of colors possible in an indexed-color image; in other words, a 256-color image is 8 bits per pixel, a 4-bit image contains 16 colors, a 5-bit image is 32 colors, and so on. The color depth of an indexed-color image can be anything from 1 to 8 bits per pixel.

The other two modes are high-color and true-color. High-color is also known as either 15-bit (32,000 colors) or 16-bit (64,000 colors). True-color is also known as 24-bit color, and consists of 16.8 million colors, which is quite a few more than most humans are capable of perceiving in any reproduced image. In real life, you can see billions of colors because our eyes rapidly adjust to read multiple levels or layers of brightness in rapid succession and our minds then blend these together.

Of the three color modes, only indexed-color relies on the use of a palette. Each color in a given indexed-color image is indexed to a specific location in a palette matrix that's attached to that image. In other words, a specific shade of green in a picture of a forest may be assigned to the third column of the fourth row in the palette. If you want to adapt an existing image to a palette other than the one that was used to create it (usually invisibly assigned by the program that created it), you have to use a utility that changes the index position of each color in the image to match it to the index position of the closest color in the new palette. DeBabelizer is exceptionally good at converting the disparate palettes of individual graphics in a large collection to a single palette with all the colors in common.

Rules Governing Web Graphics

Web graphics have a number of unique qualities. Paying attention to these can make or break the success of your Web site. Do you want millions of viewers and lots of ad revenue? Here come the rules, but remember, every rule has exceptions!

Rule #1: File size is everything

People looking at a Web page have a much shorter attention span than people looking at a printed page. If your graphics take any significant amount of time to load, you can bet that your reader will quickly surf to another wave. The bigger the file size, the longer it takes to load. A 28.8 Kbps modem loads data from the Web at a typical rate of about 1.6 Kbps. In other words, a 20KB file takes 14 seconds to load. A typical 80 x 100 pixel graphic compresses to an average of about 20KB, provided you judiciously use the tricks outlined in this chapter. You can also create illusions to make it seem as though graphics are loading at several times the speed they actually are.

Two such illusions are commonly used to get around the drawbacks of larger files:

✦ **Interlacing:** Interlaced GIFs and progressive JPEGs both fall into the first category. These images seem to load faster because the image is progressively rendered. Each rendering uses more pixels (dots) from the file to fill the image, so the picture appears quickly, but somewhat "out of focus." Then it gets sharper until all the pixels have uploaded and the image is fully revealed. The advantage is that one can usually get the information needed from the image before it is fully rendered. So you know whether you want to wait for the detail or move on.

✦ **Alt imaging:** This illusion, the LOWSRC *(low-resolution source)* image tag, accomplishes the same thing as interlacing but with a different technique. The LOWSRC image can be a very small black-and-white or limited-color image. The LOWSRC image loads first and stays onscreen only as long as it takes for the primary image to load.

> **Tip** You can use code in an HTML tag to scale a graphic to a size different from the actual file size. This can be a good idea or a bad idea, depending on a few variables. See the section on low-sourcing later in this chapter for more information.

It's a good idea to scale down the file if the browser has already loaded it earlier for use at a larger size. In this case, you already stored the large file on the server and spent the time uploading the first time. The second time the file is used, it appears almost instantaneously because all the browser has to do is scale it. Be aware, however, that the file is a bit "fuzzier" if it's automatically scaled down. Test your file in a browser to make sure that the quality is acceptable. If not, scale the file down conventionally, save it to a different name, and place the new, properly resized image on your page.

Unless you're after a pixilated, jagged, "artsy" effect, avoid having the browser scale a file to a size larger than the original if that's the size at which you want the reader to view it. Refer to Rule #7 for information about the use of low-sourcing for another exception to this rule. It's also a bad idea to scale an image to a size smaller than the original because the browser must first load the whole file and then scale it down (which takes even longer), causing performance to suffer unnecessarily.

Rule #2: The Web is a low-resolution medium

Plan on your Web pages being viewed at a typical resolution of 72 dpi (dots per inch). Although 17-inch monitors set for 800 x 600 pixel resolution have become quite popular, a few viewers are still using 12- to 15-inch monitors set at 640 x 480 pixels. A 640 x 480-pixel, 13-inch viewing area is equivalent to 72 dpi on the Mac and 96 dpi on the PC. This compares to a resolution of over 2,000 dpi in a typical corporate annual report.

Don't even think about placing page-size (or larger) detailed technical drawings, blueprints, or even organizational charts directly on your Web page. If you reduce them so they fit into a typical window at 72 dpi, not enough resolution is present to see detail clearly. Your diagrams will look like a bad case of acne. The solution to this problem is to scan the important parts of the drawing in a 1:1 ratio at 72 dpi, and then cut and paste small "close-up" sections of the drawing into separate files. These files can then be placed directly on your Web pages, in context with the appropriate descriptive text.

If you don't want to use vector-drawing techniques for map details, you can use a Web image preparation program (such as Fireworks or Image Ready) to "slice" the image. (You can find out more about programs that do image slicing and linking later in this chapter.)

Better yet, if you have maps or technical drawings to display, scan them and then auto-trace them in a program such as Macromedia FreeHand, CorelDRAW, or Adobe Streamline. Then import the vector tracing into Flash and export the image to SWF format. Most of today's browsers (about 78 percent at the time of this writing) can read this vector format without pausing to download and install a plug-in.

Meanwhile, another alternative works for some. If you're in an intranet environment in which you can control the viewer's platform, then you can use Netscape plug-ins for inline viewing of numerous vector file formats. See the Netscape plug-ins page for a listing of these, located at `home.netscape.com/plugins/index.html`.

Rule #3: The Web is color-sensitive

Subjects that require photo-realistic shading require display in millions of colors. Otherwise, they appear to be "banded" or posterized. Artists whose work you display in this manner will definitely be unappreciative.

Nevertheless, you should make sure that your graphics look okay in black and white (well, grayscale, actually). Although few people still use monochrome monitors, some will want to print out your pages on a monochrome printer. Also, if the picture looks good in grayscale, you've ensured that enough contrast exists between important elements in the picture. Such image contrast is critical to the success of image maps and the legibility of text superimposed on graphics.

It's even more important that graphics look good in a mere 256 colors because many people leave their monitors set at 256 colors and may not know that they're seeing the world through dust-covered glasses. Or, someone once told them that applications run much faster with the monitor set at 256 colors. Although this may be technically true, the real-world speed difference between 256 colors and true-color is imperceptible to most people unless they are dealing with a large graphic.

Even if you use 256 colors, type and solid-color graphics really shouldn't use more than the 219 "Web-safe" colors, which are called *Web-safe* because browsers and Windows reserve the other 37 colors for their own use. Almost all current generation image-processing programs provide some means to let you convert images to this "Web palette."

Having stated this, however, it's not strictly true that you have to reduce all images to less than 256 colors in order to be as efficient as possible. The JPEG file format accommodates only true-color (16.8 million colors) files, and most popular browsers, such as Netscape Navigator, automatically adjust images (by dithering) to 256 colors on a 256-color display. However, experimentation often proves that a file reduced to fewer colors will compress to significantly smaller sizes.

The exception to the 256-color rule is the occasion when you want to display high-quality images for photographs (browsers will do their own dithering). Even if you're showing photographs, they can often be successfully reduced to 256 colors through techniques explained later in this chapter.

If you decide to reduce a photograph to 256 colors, most image-processing programs let you choose a palette and dithering method. Always choose an *adaptive palette* (one comprised of the most prevalent colors in the image) and *diffusion dithering*. Otherwise, the colors convert to solid, banded areas.

The photographs shown in Figure 15-3 demonstrate the differences between various methods of color reduction, with and without dithering.
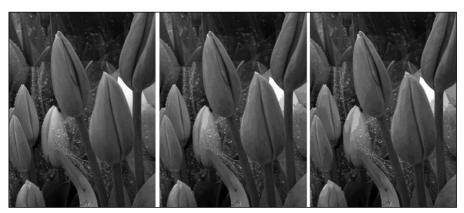
Figure 15-3: A small photo reduced to 256 colors

Rule #4: Choose the right format for photographs

Only two file formats are appropriate for photographs: GIF and JPEG. Both file formats can be read equally well on any type of popular computer. In addition, all but text-only browsers now support both file formats. Other formats may be promising, but with the exception of SWF (which is a vector format not appropriate for photos), the other formats don't have the universal playability that GIF and JPEG do.

Rule #5: Keep images reasonably sized

Never make a graphic's dimensions so large that the reader has to scroll. Most viewers see pages on a screen that measures 800 x 600 pixels. This is roughly the size of the image on 15- to 17-inch monitors, whether Mac or PC. Although it's true that many people these days set their screens to higher resolutions (1024 x 768 is quite popular) or have bigger monitors, you can't count on it. Besides, people who do this are still a small minority.

Unfortunately, you can't even make your images nearly as big as 640 x 480 pixels because your browser takes up a lot of that space. If the window is set at maximum in Netscape Navigator, the area of a viewable page is 610 x 280 pixels, and most people don't even maximize the window. The best rule of thumb is to limit width to about 450 pixels.

This means that the biggest graphic you should ever use is about 600 pixels wide and 260 pixels high. If you plan to have anything in addition to the graphic on the page, the graphic must be appropriately smaller. Thus, your portrait (vertical aspect) images must be smaller than 260 pixels square.

The one exception to these size limitations is backgrounds. Single-image backgrounds should be as large as the largest screen likely to view them. Also, horizontal tiles should be as wide as the largest window in which they can be viewed. (1,024 pixels wide is a safe bet.) This way, people using large screens at high resolutions won't run out of background when these elements are used. Background elements repeat automatically if they are smaller than the viewing window. If you are making a tiled background, remember this: The smaller the tile, the faster it loads. See the section on backgrounds later in this chapter for more information.

Another exception to this size limitation is one that many artists and photographers insist on making. They feel that their images lose too much detail at such small sizes. The truth is that these images lose too much detail no matter how they are displayed on the Web. However, keep in mind that poor image quality can be an advantage in that it is one defense against the theft of your artwork.

Rule #6: Use images repeatedly

The browser only needs to load an image once, because it *caches,* which means that information is held in memory on the local computer. Thus, any subsequent appearance of that image loads almost instantly. This excellent trick makes the performance of your site seem miraculously fast. Keep this rule in mind when you're tempted to make a different bullet for each subject list or to use nine different kinds of page dividers within the same site. Also, following this rule can save you considerable space on your Web server, and saving server space can save you money. Finally, it makes site maintenance easier because you have fewer links to track.

Rule #7: Don't depend entirely on automated converters

To put it another way, most converters can't do the refined steps in the Web-enhanced versions of GIF (GIF89a) or pJPEG (progressive JPEG) and won't do anything to create a low-source image as a substitute. Each of these qualities can contribute to making your Web site faster to load, quicker to browse, and easier on the eye. The following three sections explain how to overcome the limitations of automated converters.

Transparency

Transparency refers to making one color in an image invisible, thus enabling the image to blend smoothly with any background. The same image can then be used on a number of pages with varying background colors and textures. Transparency is a property currently unique to the GIF89a and PNG formats, so you can't make JPEG graphics transparent. Figure 15-4 shows a transparent GIF89a image. The transparent area was possible because the image was given a solid-color background. GIF89a enables you to specify any single color as transparent.

Figure15-4: A transparent GIF image

> **Note** Some programs, such as Photoshop, enable you to specify that the transparent area of a layer or an alpha channel determine the border between opacity and transparency. These programs actually substitute a single color for the masked area.

Interlacing and progressive JPEG

One way to speed the display of graphics-enhanced Web pages is to make GIFs interlaced and JPEGs progressive. Both interlaced GIFs (iGIFs) and progressive JPEGs (pJPEGs) appear quickly because only some of the pixels in the image are loaded first. As a result, you see a rough (out-of-focus) approximation of the final image while the rest of the image loads. If you decide you're not interested in the detail (or if you've seen it before), you can move on without waiting for the rest of the file transfer.

Never interlace a transparent background GIF. Interlacing in conjunction with transparency causes intermittent problems with some browsers (such as Netscape Navigator). The result is a "broken GIF" icon in place of the picture. All popular browsers that support graphics support iGIFs.

Progressive JPEG quickly places a low-resolution version of the image in your browser, and then rescans the image several times, displaying it at higher resolutions each time. The last scan produces full resolution. This reduces viewer frustration because he or she gets a sense of what will be on the Web page much more quickly.

Built-in support for saving to pJPEG is somewhat more rare than support for saving to iGIF at the time of this writing, but it's expanding rapidly. Support for progressive JPEGs, however, began mostly in the second generation of graphical browsers, such as Mosaic and Netscape Navigator. AOL's browser became fully compatible with progressive JPEGs in version 3.0. Microsoft Internet Explorer incorporated fully progressive display in version 5.0.

Low-sourcing

Low-sourcing can be a substitute for progressive JPEGs (pJPEGs) or interlaced GIFs (iGIFs). Sometimes this method is more efficient than pJPEGs or iGIFs, but that depends on how you make the low-source images.

Low-sourcing gets its name from an HTML tag that substitutes an alternative file (usually of much lower resolution or monochrome) until the data for a higher-resolution file has been loaded.

You should use two separate files in an image tag with a LOWSRC attribute, such as SRC= image or LOWSRC= image. The LOWSRC= image's file size should be much smaller than the original image (less than 25 percent). You can use several techniques to make LOWSRC images. The technique that you use depends on the size of the SRC image and the effect that you want to achieve. The second file can be smaller, for one or more of the following reasons:

✦ The image is a black-and-white version of the full-color, high-source image.

✦ The colors have been reduced in the image.

✦ The image dimensions are much smaller. For example, you can simply make a copy of a 200 x 300 image, scale it to 50 x 75 pixels, and then insert a size attribute in the image tag to force the display of both images at the same size.

Note   Using a grayscale image as your low-source image can be a very effective means of presenting photographs on the Web. Because a grayscale image is ⅓rd the file size of a color image with the same dimensions, it loads quickly and you can still see all the detail in the image.

Rule #8: High bandwidth is no excuse for inefficiency

Even if your site is on a corporate intranet where every viewer has a high-speed connection, you can do better things with bandwidth than waste it on unnecessarily large graphics (such as provide more viewers with more information and not create bottlenecks in the network).

Categorizing Web Graphics

The kinds of graphics that you're likely to need on your Web pages can be categorized. Understanding these categories, described in the following sections, can help you to create these types of graphical elements.

Text

If you want to design your pages for most browsers, using text converted to bitmap graphics controls the typeface displayed on your user's screen. Otherwise, the browser makes the choice. The browsers used by more than 95 percent of Web surfers allow only two typefaces: monospaced Courier (typewriter) and a variable-spaced font (typically Times Roman). Furthermore, by using graphics, you can control items such as the layout of text, headlines, pictures, and other content elements.

When you use graphical text, you can use any font in your computer at any size. You can also specify any typographical attributes, such as spacing, kerning, or leading. You can't do any of this with HTML text. Unlike HTML text, when you use graphics, the font style isn't dependent on the destination system. When you use graphical text, you can achieve the following effects:

✦ Freehand lettering

✦ Multi-colored letters

✦ Special effects, such as embossing, drop shadows, glow, gradient fills, or outlining

One of the more attention-getting tricks that you can use in Photoshop is to use text as a way to frame photographs. This technique has been used in the postcard industry for a long time. Because Photoshop and Photoshop Elements also present us with quite a few layer styles that let us automatically perform actions, such as beveling edges and giving text a metallic look; I show you how to apply a layer style to the text, warp it, and then place text inside the photo, so you get a result like that shown in Figure 15-5.

Figure 15-5: A fictitious postcard, made just to show off what can be done with a combination of text warping, layer effects, and placing text inside a photo

To achieve results like those shown in Figure 15-5, follow these steps:

1. **Open the file** Waves **from the CD-ROM.**

2. **Open the file** Cliff Houses **from the CD-ROM.**

   This is the image on which you place text. Make sure that this is the active window by clicking it.

3. **Choose the Text tool.**

4. **From the Text tool Options Bar, choose the following settings:**
   - Bookman Old Style (from the Font menu)
   - Bold (from the Style menu)
   - 48 pt. (from the Set the Font Size menu)
   - Smooth
   - Left justified
   - Black

   All these settings are shown in Figure 15-6.

Figure 15-6: The Text Options Bar, showing the settings used in this exercise

5. Click at the point where you want to start the text and type Santa Cruz**.**

6. Click the Warp menu and choose the Arc style.

Take note of how many other ways you can warp the text.

7. Select Commit Any Current Edits.

The black, curved letters appear as though they were typed on the photo. Photoshop always places type on its own layer, so the text is actually floating over the scene.

8. Choose the Magic Wand tool.

Select the inside of each letter. Because the text is on its own layer, you don't need to worry about whether the marquee will expand outside the text. Just select the first letter, press Shift, and then select each letter or independent part of a letter, such as the dot over a lower-case "i" or "j". You want to keep a black rim around the letters, so shrink the selection a bit.

9. Choose Select ⇨ Modify ⇨ Contract.

The Contract Selection dialog box appears.

10. Enter 4 in the Contract By field and click OK.

The result looks like the image shown in Figure 15-7.
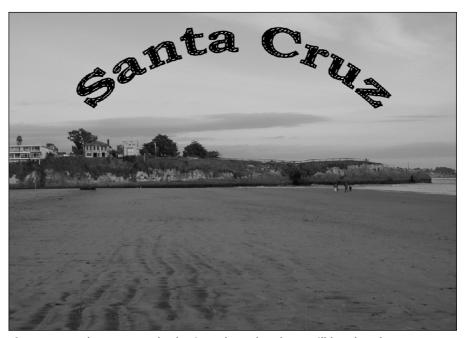
Figure 15-7: The contracted selection where the photo will be placed

11. Click to activate the Waves window.

The next step is to place the photo inside the selection.

12. Press Cmd/Ctrl + A to Select ⇨ All, and then press Cmd/Ctrl + C to copy the contents of the selection to the clipboard.

13. Click the Cliff Houses window to activate it, and choose Edit ⇨ Paste into.

The swirly surf appears inside the selection marquee that's inside the letters. You can use the Move tool to reposition the photo inside the marquee.

14. When you are satisfied with the results, press Cmd/Ctrl + D to drop the selection.

The next step is to apply a beveled layer style to the warped text.

15. Choose Layer ⇨ Layer Style ⇨ Bevel and Emboss.

Because you can choose from many settings in the Layer Style dialog box, I encourage you to experiment. You can add one style to another by checking the boxes alongside their names in the left column. To set the options for each of these styles, click to highlight their style name bars. You can see the settings I used in Figure 15-8.
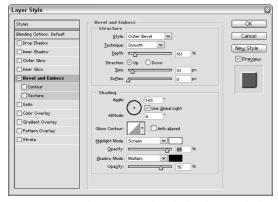
Figure 15-8: The Layer Styles dialog box with the Bevel and Emboss styles selected

Illustrations

Illustrations are appropriate at some place in almost every kind of site, though they may be more important in digital magazines, catalogs, and children's sites than in heavily text-oriented sites. Illustrations differ from other types of graphics in that they are used primarily to mirror or to complement the text. Illustrations are also usually bigger than other types of graphics. Often, they are full-color photos or gradually shaded artwork, so file sizes tend to be much larger than for other types of graphics. Illustrations can be decorative or instructional. Sometimes illustrations

tell the whole story and are accompanied by little or no text on the page, as shown in Figure 15-9. Illustrations should never be so large that the viewer has to scroll to see the whole picture. When creating or placing illustrations, take care to keep their size slightly smaller than the typical user's browser window. (See Rule #5 under the "Rules Governing Web Graphics" section.)
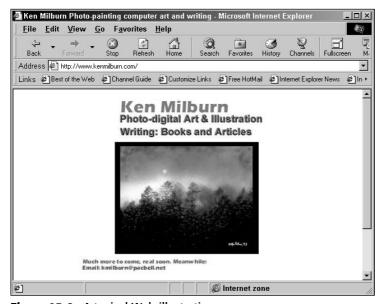
Figure 15-9: A typical Web illustration

Backgrounds

Backgrounds are the "paper" on which your Web content is printed. You should know how to control your backgrounds so you can design them to complement your photos. Most browsers default to a medium gray or white background and black text, but you can specify any color for a background and any color for text. Any browser that's compliant with the HTML 3.2 specification, which includes most current versions of popular browsers, can properly interpret the instructions for colored backgrounds. Netscape Navigator 2+ and Internet Explorer support colored text, but it isn't as widely supported as colored backgrounds. To be safe, keep your backgrounds light enough that black text is readable against them.

Suppose that you want a photo or paper texture in the background. Most browsers can now read graphic backgrounds, so you can load any image into the background. This image repeats itself from left to right and from top to bottom as many times as necessary to fill the entire frame. Remember, this repetition occurs more times for a full frame on a 20-inch monitor at 1,024 x 768 pixels than for a full frame on a 640 x 480-pixel, 12-inch monitor.

Background images can be of any type, but you need to design them so they don't interfere with the readability of text or unintentionally confuse the content of over-laying graphics. Also, because backgrounds are the largest element in a Web page, it is especially important to design photographic backgrounds to upload as quickly as possible. Either use every trick in the book to make the file sizes for large images small, or use very small tiles. Actually, a background tile about 20 pixels square loads nearly as fast as a 1-pixel tile and fills the screen about 20 times faster because it has 20 times fewer repeats.

You can expect to achieve several types of "effects" with background images. These effects are discussed in the following sections.

Background images

1. **Open the file** Angel Island **from the CD-ROM.**

   Make the image the size it will be when it is used as a background image. This size should usually be 1024 x 768 pixels at 72 dpi to make sure that it covers the size of the largest browser window that is likely to be used to view that page. If your page is going to be a long one with lots of text, the vertical height must be quite a bit taller.

2. **Choose Image ⇨ Re-size ⇨ Image Size (Image ⇨ Image Size in Photoshop 7).**

   The Image Size dialog box appears.

3. **Under Pixel Dimensions, enter** 768 **in the height field.**

4. **Enter** 72 **in the Resolution field.**

   The other settings are the defaults and should be left as they are, as shown in Figure 15-10.

5. **Click OK.**

Figure 15–10: The Image Size dialog box showing the settings for re-sizing a non-tiled background to fit a maximum-size Web page

6. **Size the image so that the vertical size matches that of the other images in the collection.**

   Now, trim the other dimension with the Fixed Size Rectangular Marquee, as shown in Figure 15-11.

7. **Set the Options Bar for Fixed Size.**

8. **In the Height field, enter** 768**. In the Width field, enter** 1024**.**

9. **Click in the image to show the marquee.**

   If it isn't positioned properly, place the cursor inside the marquee and drag it into your preferred position.
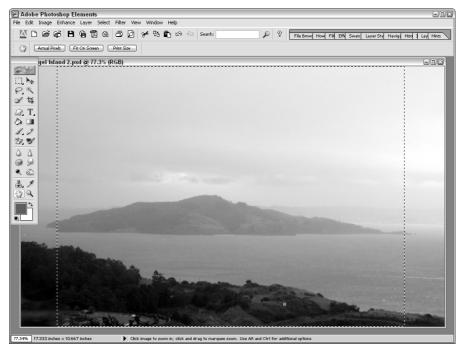
Figure 15-11: The original Angel Island photo, re-sized to 768 pixels high. The Rectangular Marquee is set at a fixed size so the photo can be cropped to exactly the right size.

10. **Choose Image ⇨ Crop.**

    Your image is now the right size for a background photo.

11. **Choose Image ➪ Enhance ➪ Brightness/Contrast.**

The Brightness/Contrast dialog box appears, as shown in Figure 15-12. You want to flatten the image into a narrow range of very bright tones so that, although you see a fairly full range of image detail, the overall tone is bright enough not to interfere with the text.

Figure 15-12: The Brightness/
Contrast dialog box, shown as
used in this exercise

12. **Drag the Brightness level about halfway between the center and the right side of the slider.**

13. **Drag the Contrast slider about halfway between the center and the left end of the slider.**

Your image should now be a high-key, soft gray.

14. **Add a layer of type to see how it reads, as shown in Figure 15-13, then delete it.**

15. **Choose the Text tool.**

Place the cursor in the darkest part of the image, and then type some text over it. If you can read the text, you're done. If not, go back to Step 12 and readjust the Brightness/Contrast sliders until the darkest part of the image is light enough to read the text.

16. **Save the image, and then use your HTML editor to enter it as a background image.**

Tip   You may want to place the center of interest in the background photo at the upper-left of the picture so that it is at the center of interest in smaller screens. Usually, however, it's best to just use a photo that lends atmosphere without attracting too much attention to itself.

Welcome to Sausalito
Scenic Playground of
Marin County

Located at the extreme West end of
Marin County, at the base of Mt. Tmalpais,
the foot of the Golden Gate Bridge and the
gateway to the Golden Gate Natinal Recreation
Area, Sausalito is home to a wide variety of
citizens, from houseboat hippies, famouse
entertainers, and executives whose offices
are in San Francisco.

Sausalito is also home to the leading art
festival in the United States, to one of the
world's most famous houseboat communities,
and to the Cafe Trieste--sometimes called the
Cafe Screentest because so many come there
to "see and be seen."

Figure 15-13: A background image with test text superimposed on it to check the readability of the text

Semi-solid backgrounds

You create semi-solid backgrounds by making a background image tile that is as wide as any viewing window is likely to be (1,024 pixels is a good number). We call them "semi-solid" because if the window happens to be larger, the background image will tile. The height can be as narrow as you like because the tile simply repeats as often as necessary from top to bottom. Because this tile is so wide, its file size is bigger (unless it is very shallow). A height of one or two pixels is the best compromise between loading time and screen-painting time. Figure 15-14 shows a good example of a semi-solid background.
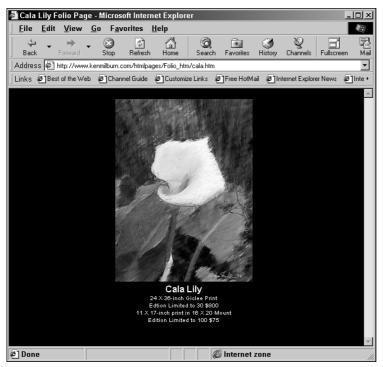
Figure 15-14: This Web page has a solid color tiled background, which makes it very easy to read dense text. Solid backgrounds are also a clean environment for presenting photos.

Full-screen images

Full-screen images provide users with all the necessary information without requiring any HTML text. Usually such images contain graphic text. In addition, an image map is required for some sort of negotiation. A hybrid full-screen image can be a full-screen background image tile with minimal HTML text in links (such as a navigation bar) in the foreground. These images work best if they contain very few colors and large areas of solid color so they compress to a small enough file size to enable them to load quickly. Figure 15-15 is an example of a full-screen image.
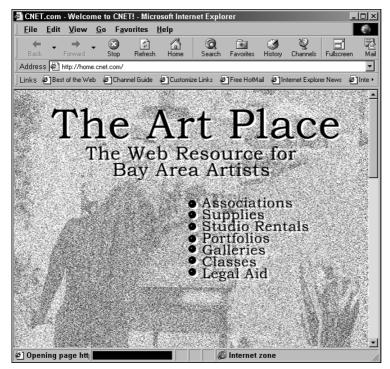
Figure 15-15: A full-screen image

Textured and patterned backgrounds

Textured and patterned backgrounds are variations on background tiles. *Textured backgrounds* are simply images with no definable subject, such as sand or burlap. *Patterned backgrounds* are repetitions of a shape, such as a drawing of an apple, flower, or company logo. Textured and patterned backgrounds are usually created as "seamless tiles" that repeat in a contiguous left-to-right, top-to-bottom sequence. Figure 15-16 is an example of a patterned background.
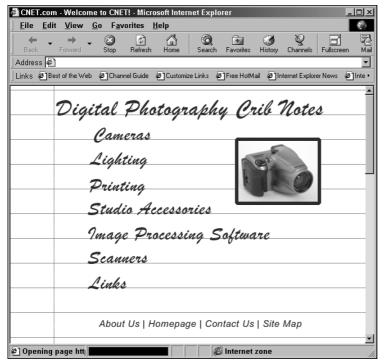
Figure 15-16: A patterned background

Multiple backgrounds

Multiple backgrounds use images within an image to compose a full-screen background image that appears to be several backgrounds, as shown in Figure 15-9.

Strictly speaking, Figure 15-17 doesn't show a background, but whole images that have been inserted into table cells. The appearance of text over a background is "faked" by creating the text as part of the graphic image. The cell borders have been set at zero, so they're invisible. The content has been placed within the cells so that it appears to float over the whole page. To make your design work, you have to spend some time experimenting with font sizes, colors, and object alignments.

Tip   The easiest way to create multiple backgrounds is to create one large graphic, place your text over it, and then slice the image in a program such as ImageReady or Fireworks. These programs automatically create the HTML code necessary to make the table and to place the graphic into the cells.
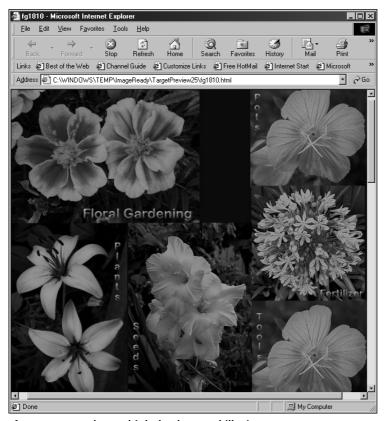
Figure 15-17: The multiple-background illusion

Irregularly-shaped graphics

An *irregularly-shaped graphic* appears to have a nonrectangular border, but is in fact rectangular. The graphic appears to be irregularly shaped because its solid-color background is either designated as clear in a GIF89a file or matches the page background's color. The name is a little misleading in another way: The shape can actually be regular, as in an oval, circle, or polygon — it just can't be rectangular.

Irregularly-shaped graphics have so many uses you will find them indispensable. For one, they are the only way to make graphics text appear to be a "typeset" element of the page layout. Navigation icons, as shown in Figure 15-18, also integrate better into the layout when they don't appear to have a separate frame or background.

Figure 15-18: Typical
navigation icons

Bullets

Bullets are simple-shaped graphics that call your attention to something. Usually, they look like tiny buttons without words and are used to set items apart in an unnumbered list. Several variations are shown in Figure 15-19.

Figure 15-19: All of these images can be used as bullets.

Icons

Icons are small, "high-concept" images meant to quickly give the reader a message that takes less time to read and is more universally understood than if the same message were spelled out in words. Some designers suffer from "icon mania" and use icons in places where a single word may be more easily understood. The most universally understood icon is a circle with a diagonal line, meaning "negative," "no," or "not." Traffic signs make good icons for the Web. Figure 15-20 shows examples of icons.

Figure 15-20: The row of images at the very bottom of the page is meant to be used for navigation: Home, Back, Forward, Last page, Send Us E-mail.

Rounded buttons

Rounded buttons give dimension to your page and can be used for navigation (with superimposed type) or as bullets to emphasize important text. See Figure 15-21 for examples of rounded buttons.

Making rounded buttons is easy if you have Photoshop and Kai's Power Tools (KPT) or an image editor, such as Paint Shop Pro that has its own version of the KPT Glass Lens filter. Follow the steps in the next section to create rounded buttons.

This exercise was written for Photoshop, but you can complete it with almost any image editor that supports Photoshop plug-ins:

   1. **Open a file that contains the color or texture that you want to use for your button.**

Figure 15-21: Here, the Hand icons shown in Figure 15-20 have
been turned into round buttons.

2. Double-click the Rectangular Marquee tool and change it to Elliptical.

3. Drag an ellipse around the area where you want a button.

If the button has to be a particular size, make sure that you have chosen
Window ➪ Palette ➪ Show Info. If you want the button to be round rather than
elliptical, press Shift as you drag.

4. Choose Edit ➪ Copy to save your button to the clipboard.

5. Choose File ➪ New and click OK.

6. Choose Edit ➪ Paste.

7. Save the selection.

8. Choose Window ➪ Palette ➪ Show Layers.

9. Double-click the Floating Layer bar and name the layer.

You now have a floating layer and can fill the background with any color or
texture that you like. Your file is now cropped to exactly the size of your
button. Keep the Selection Marquee active (or save the selection so you can
bring it back).

10. **Choose Selection ➪ Load Selection and click OK.**

    The selection reappears on the Button layer.

11. **Choose Filter ➪ KPT Extensions ➪ Glass Lens (Bright, Normal, or Soft for the effect you like).**

    Presto! You've got a button!

12. **Choose the Options arrowhead at the upper-right corner of the Layers palette.**

    A fly-out menu appears.

13. **Choose Flatten Image.**

    This combines all the layers into one.

14. **Finally, save the file as CompuServe GIF.**

You can also make rounded buttons in any 3-D modeling program that does ray-traced, Gourard, or z-buffered rendering. Simply make a sphere, map your favorite texture to its surface, and render. Open the rendered file in your image editor, crop it, and save as GIF.

Banners

Banners are used to show and announce an advertisement. Banners often contain image maps to link to specific sites. Even if you don't have advertisers on your site, you may want to use banners to promote ideas, announce products that your company wants to sell, or point out features of your site.

Standard advertising practices dictate two sizes of horizontal Web banners at 476 x 54 pixels and 154 x 56 pixels, and a small vertical banner at 70 x 130 pixels. However, today's advertising is less restrictive regarding ad size.

Animations

You may have heard about the Web being "everyone's" vehicle for multimedia. Although this statement is somewhat true, don't think about putting conventional animated multimedia files on your Web site unless you are working within the context of an intranet with T1 or faster connections. As cable modems and other high-speed access becomes more widespread, multimedia will reach its full power over the Web. In the meantime, remember that despite the increasing popularity of DSL and cable modems, most Web access is still at 28.8 Kbps or slower. This means a 60KB file takes a full minute or more to download; 60KB is tiny for a motion file such as a QuickTime or Video for Windows (VFW) movie. Surveys show that most Web surfers won't wait more than a minute for a page to load. You must really work to keep your animations as small as possible. Also, give viewers something to read or some other interesting graphics that will load first. If your viewer is busy looking or reading, pages will seem to load faster.

Animations can be anything from simple "flipbook" cartoons to live-action video footage. Simple cartoon-type animations that consist of only 2 to 10 frames are best suited for use as inline attention-getters because their file sizes can be kept to a bare minimum for quick loading.

Animated GIFs

Animated GIFs are one of the most effective, lowest-overhead ways of using animation to attract attention. With a little time and practice, anyone can make an animated GIF.

Animated GIFs are simply multiple images saved within a single GIF89a file. When the file is placed on an HTML page (using the <IMG> tag and viewed with a supporting browser such as Internet Explorer or Netscape Navigator), animation begins almost as soon as the page is loaded. No special plug-ins or helper software is required.

Numerous software utilities for both the Mac and Windows can assist you in saving the individual images or "frames" of your animation as a single GIF89a file. Some also provide drawing tools, and a few even provide "tracing paper" so that you can superimpose the drawing of a new frame over the drawing of the previous frame to be sure that the movement between frames is smooth and "in register" with the position of the same objects in the frames that immediately precede and succeed the current frame. This helpful feature enables you to check *registration* (the position of objects in one frame relative to the position of the same objects in the next frame) as you go.

Making an animated GIF

One of the easiest ways to make an animation is to shoot a burst sequence with a digital camera. For a simple animation such as winking, pointing a finger, or walking, you can have your "model" move slowly enough to make the three or four frames-per-second of the burst shot seem to run at "normal" speed when the animation is played back. It's really easy to turn these shots into an animation in Photoshop. To do so, open all the images, reduce the windows in size so that you can fit them onscreen at the same time, re-arrange the windows in the sequence that you want the frames to be in, then (in the required sequence) drag each image on top of the last in the same window. The result is the first frame of the animation on the bottom layer and the last frame on the top layer. You then jump into ImageReady, click the Use Layers as Frames button, and play back your movie.

Another way to make an even simpler movie is to copy the same image onto several layers, and then change the aspect of one item (such as the eyelid in the photo that you can make into a movie by using the following exercise) on each layer. After you've done this, you just have ImageReady use the layers as frames. The following step-by-step procedure outlines how to make such an animation:

1. **Open the file** Cats Eye **from the CD-ROM.**

2. **Press Cmd/Ctrl + A to select the entire image, and then press Cmd/Ctrl + J.**

   This automatically creates a new layer with the same content as the present layer.

3. **Repeat the Cmd/Ctrl + A then Cmd/Ctrl + J sequence two more times.**

4. **Choose Window ➪ Show Layers.**

   The Layers palette comes to the front.

5. **Click the eyeball icon on the left of the top two layer name bars to turn those layers off.**

6. **Choose the Clone Stamp tool.**

7. **Click the Layer Name bar of Layer 2 to activate it.**

8. **Press Opt/Alt to set the target for the Clone Stamp in the fur of the cat's eyelid.**

9. **Clone the eyelid so that it is slightly closed (about ⅓rd of the way).**

10. **Click the eyeball icon in the Name bar in Layer 3 to turn on that layer.**

11. **Clone the eyelid so that it is cloned about halfway further down than in Layer 2.**

    This cloning process is illustrated in Figure 15-22. If you want to see the eyelid's position in relation to it's position in Layer 2, drag the opacity of Layer 3 to about 50%. When you've finished cloning, drag it back to 50%. You can see the progression of cloning in each layer in Figure 15-22.

Figure 15-22: Cloning the eyelid so that it closes a bit further in each layer

12. **Reduce the image to the size it will be in the final animation.**

    Make this one about 1½ inches tall.

13. **Choose Image ➪ Image Size.**

    The Image Size dialog box appears.

14. **Set the options, as shown in Figure 15-23. After you finish, click OK.**
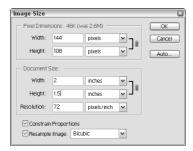
Figure 15-23: The Image Size
dialog box showing the settings
used to make the image 1½
inches high in a Web browser
window

15. **Click the Jump To ImageReady button at the bottom of the Toolbox.**

   In an instant or two, you see the image in ImageReady, as shown in Figure 15-24.

Figure 15-24: The cat's eye animation,
as seen in the ImageReady Animation
palette

16. **Click the Animation Palettes menu icon (the small encircled arrowhead at the upper right side of the palette).**

   The Animation Palette menu appears.

17. **Choose Make Frames from Layers from the Animation Palette menu.**

   Each layer, starting from the bottom and moving to the top, appears in the Animation palette.

18. **Immediately under each frame, you see a small arrow pointing down. Click it to reveal the Frame delay time menu.**

19. Choose 0.1 Seconds for all but the last frame.

20. Choose 0.2 seconds as the frame delay time for the last frame.

This is so the last frame remains onscreen a bit longer before the animation repeats (loops).

21. Play the animation by clicking the Play button at the bottom of the Animations palette.

The image in the main ImageReady menu animates. You can also preview your animation in a browser. Click the Browser icon near the bottom of the Tools palette (the Internet Explorer symbol). Your screen is taken over, as shown in Figure 15-25.
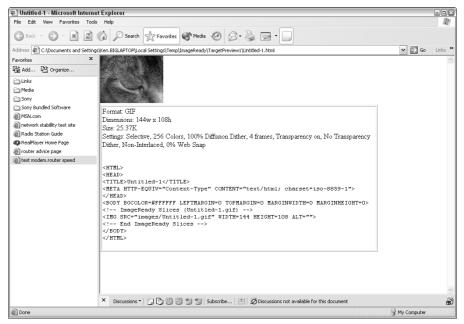
Figure 15-25: Previewing your animation in the Browser

22. To save your Web animation, click the Optimize tab in the main window and click the Optimized button.

In the Optimize palette, choose GIF 32 Dithered from the Settings menu.

23. Choose File ➪ Save As.

The Save Optimized As dialog box appears.

24. Choose Images and HTML from the Save As Type menu, and click OK.

Content dividers and picture frames

Content dividers are best known as horizontal and vertical rules. Horizontal rules are easily placed in HTML by using the <HR> tag, but HTML imposes the following limitations:

✦ Vertical rules are not available. You have to "fake" them with tables or frames.

✦ Horizontal bars are solid and act as visual barriers to proceeding farther down the page.

Picture frames are actually not separate graphical elements, because in order for them to work, they must be merged into a single graphic with the picture that they frame. Still, you can make one frame and then resize it to fit any number of pictures.

One of the best ways to make picture frames is to photograph real ones. Light them at a consistent key-light angle, so that if you mix frame styles, they all look like they're hanging on the same wall at the same time. Using an image-processing program that has layers, knock out the frame's background. In other words, it should float on a transparent layer.

1. **Copy the frame layer.**

2. **On each layer, use the Polygon selection tool to draw a diagonal line from one corner of the frame to the other.**

    Continue the selection around opposite sides of the frame on each layer.

3. **Delete the contents of the selection.**

    You should have L-shaped frames.

4. **Place the photo that you want to frame on yet another layer and drag that layer below the frame layers.**

5. **Use the Move tool to place the sides of the frame so that they just frame the photograph.**

6. **Use the Polygon selection tool to trim the overlapping end of the frame so that the corners are mitered.**

Note   Many image editors, such as PaintShop Pro and PictureIt! have built-in frame-making routines that are quicker and easier than the exercise above. However, the exercise above works in any image editor—even old-fashioned ones such as Photoshop 7.

QuickTime panoramas and other virtual experiences

One of the most attention-getting things you can do with digitized photos is to use them to give the viewer the feeling of being inside an explorable environment. By far, the most popular way to do this is with a program that can "stitch" together a series of photographs so that they form a seamless 360-degree view. The result is then saved as a QuickTimeVR "movie." The QuickTime plug-in is now built-in to both the Netscape and Microsoft Web browsers, so most of your viewers can use their mouse to pan the panoramic view and to zoom in on details within the scene.

Numerous programs can stitch your images. Some image editors, including Photoshop Elements, Corel PHOTO-PAINT, and Ulead PhotoImpact 5, are also starting to include stitching capabilities.

Making Web photo galleries

Both Photoshop and Photoshop Elements automate the production of Web photo galleries. These galleries give you the option of having row and column thumbnails or filmstrip-type thumbnails that you can thumb through with a big picture above or to the right of the image.

Some options let you choose different colors for the background, links, and title banner text. You can also change the color of the overall background, the color of the banner background, and so forth.

Making the Photo Gallery is so easy it's almost automatic, if you follow these steps:

1. **Create a folder that you want to use to hold all the pictures in this gallery.**

   The photographs that you put into this folder can be virtually any size and can be in any Photoshop-compatible file format. I put the files into JPEG format to save space. This way, I can build new galleries and post them to my Web site very quickly. Also, this makes it easy to change the mix of photos in each gallery folder so that I can keep the galleries fresh.

2. **Open either Photoshop or Photoshop Elements and choose File ➪ Automate ➪ Web Photo Gallery.**

   The Web Photo Gallery dialog box appears, as shown in Figure 15-26.
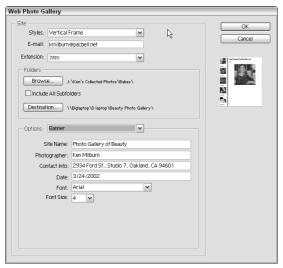
Figure 15-26: The Web Photo Gallery dialog box
with the Banner option selected

3. Choose the settings shown in Figure 15-26.

If you don't want to crowd your images, be sure that the typeface you choose
is no larger than 4 or 5 points or leave some of the Banner Options blank.
Next, set the options for the larger images that will be shown when the viewer
clicks one of the thumbnail images.

4. From the Options Menu, choose Larger Images.

The appropriate options appear below the menu. For the purposes of this
exercise, choose the options shown in Figure 15-27.

Figure 15-27: The Large Images
option and other settings

5. From the Options Menu, choose Thumbnails.

The appropriate options appear below the menu. For the purposes of this exercise, choose the options shown in Figure 15-28. The smaller the size you choose for the thumbnails, the more you can see at a time and the larger the space is for your image. I feel that this also encourages the viewer to click the thumbnail to see the larger image.

Figure 15-28: The Thumbnails option and other settings

6. From the Options Menu, choose Custom Colors.

You see a group of six color swatches. Click each swatch to make the Color Picker appear and use it to pick the color for your preferred item, as shown in Figure 15-29.
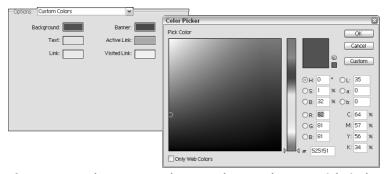
Figure 15-29: The Custom Colors swatches are shown. At right is the Photoshop 7 Color Picker, which is the same as the Color Picker used in many other applications, including the native Macintosh Color Picker.

7. Choose the Security Options.

These options place a watermark on your larger images to prevent use without permission or credit. You can opt to use these watermarks. The information is taken from the EXIF information that you have stored with your file. If you want to view this information, preview the image in the Photoshop Browser.

8. Click OK.

You see the photos for the gallery automatically open one at a time and be resized for the gallery. If you have any subdirectories, you get an error message saying that Photoshop can't open some files. Next thing you know, you see your gallery page previewed in Internet Explorer, as shown in Figure 15-30.
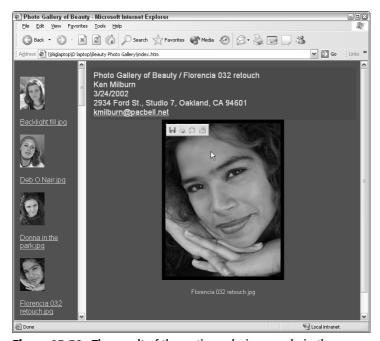
Figure 15-30: The result of the options choices made in the previous exercise

One of my favorite features in Photoshop is that you can make a browser button appear that allows the viewer to save the image, print the image to their desktop printer, automatically e-mail the image, or open the My Pictures folder.

Many other image-editing and Web utility programs have a similar automated feature for producing Web galleries. Most of these are quite inexpensive and if one has the design options that you're looking for, it may be worth their price for this feature alone.

Summary

This chapter focused on why and how you should use photographs on Web sites. I also discussed when to use and when *not* to use photos (as opposed to other types of graphics) on a site. I summarized the options available for Web file formats, color modes as they apply to the limitations of the Web, and the characteristics of different types of graphics components used on the Web. Finally, I introduced the possibilities for QuickTime virtual experiences.

✦   ✦   ✦

Miscellaneous Digital Magic

This chapter is about what I call "accessory software." This term refers to special-purpose software that can enhance your digital imaging capabilities in a particular way. This term excludes programs that you use to process your digital photographs, but can include programs that create their own images that you can add to your digital photographs.

I include exercises in this chapter to show you how to use some of these programs. I explain why you may want to purchase these programs, and I also detail the chief limitations and the learning curve associated with each program.

Batch Image Processing

Batch image-processing programs take the dreariness out of monotonous jobs. Their job is to perform repetitive image-processing chores automatically on large numbers of files. In terms of complexity, they vary from the simple to the sublime and have prices to match.

The most common job required of batch processing software is converting files from one file type to another. Ordinarily, you have to open the file in your image processor, make any necessary changes to the orientation and color model, and then save each image to a single common file format. Now imagine how much easier it is to perform one operation that does all this for a hundred files than it is to do all that a hundred times.

It is becoming more and more commonplace to be able to do batch file conversions and macro routines right inside such programs as Photoshop, Photoshop Elements, PaintShop Pro 7, and Corel PHOTO-PAINT. These programs do a perfectly

adequate job—as long as you need to process only dozens rather than hundreds of files at a time. These programs are *not* the right choice if you need to process multiple categories of tasks, such as converting a variety of formats to JPEG, reducing them to fit within a given vertical and horizontal space, converting all to RGB color mode, and then optimizing all the files to a given level of Web performance.

If you are managing large (or numerous) Web sites, doing game production, or creating illustration-heavy multimedia productions, you need Equilibrium DeBabelizer or "DeBab," as its devotees lovingly call it. For really complex batch jobs, DeBabelizer is easily the most professional and powerful batch image processor. It is available in versions for both Macintosh and Windows, though the interface and features differ somewhat from platform to platform. Macintosh users who don't need all the features of the full version can buy a much less costly LE version.

You can set up DeBabelizer to translate one set of original images (the set can be any size) into many versions that can be used for multiple purposes. For example, you may need to create the following:

✦ A set of thumbnails in GIF format all scaled to fit within one size

✦ A set of full-frame Web page images

✦ A series of images for printing on a large format printer

✦ A set of images for use in a print catalog

✦ A set of images to be printed for a photo album

After you've set up DeBabelizer to create what you need, one press of a key processes all the images in the variety of ways you need. The images can even be sent to different directories, stored in different filename sequences, and so forth. Heck, you can even go nuts and set up several different and unrelated batch operations and then have the program run them in sequence while you take a nap.

DeBabelizer does an excellent job of optimizing a palette that can be used for a whole group of graphics. This is especially important if you are placing files into an animated GIF or into some presentation managers because those applications use the first palette encountered for all graphics. Because colors are indexed to a particular location in the palette, the colors in any given image will shift according to the colors that are assigned to a particular location in the common palette.

Some of the features offered in the latest version of DeBabelizer include the following:

✦ DeBabelizer can now automatically process layered Photoshop files into single-layer files.

✦ DeBabelizer can now recompress animated GIFs to eliminate data that doesn't change between frames. Equilibrium claims that this can make the file as much as 75 percent smaller.

DeBabelizer can automatically acquire, process, and optimize images from any digital camera. If you are wise enough to save your images to disk in a non-lossy format, DeBabelizer can automatically convert these images as you acquire them. The program can also convert and batch-process images from Photo CDs. Among the zillions of bitmapped file formats that DeBabelizer supports are FlashPix and MegaPixel.

You may have stayed away from DeBabelizer because of its reputation for complexity. Of course, nothing this flexible and powerful is going to be simple. On the other hand, the more recent versions of the program (for both Windows and Macintosh) have been made far more intuitive than their predecessors. To use the program, load a test file, make your menu selections for modifications, open the log file to which your commands were automatically added, and then drag any commands that you want to keep into the script window. Next, open a batch list window and drag filenames from a browser into the batch list. Now you can just right-click to run the script on the entire list of files. You can access all of the program's power by making menu and dialog box selections, as shown in Figure 16-1.
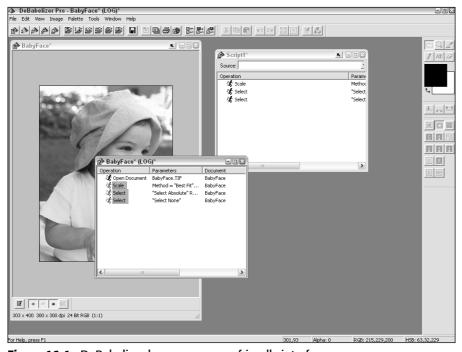
Figure 16-1: DeBabelizer has a more user-friendly interface.

DeBabelizer can also do a considerable amount of batch image processing. This can be especially valuable in commercial shoots when a lab misunderstands a processing instruction, or if your internal light meter suddenly becomes inaccurate by a stop or two—this actually happened to one of the cameras I tested for this book. The image processing DeBabelizer does fall into categories that can be applied wholesale to groups of images:

✦ Adjust frame (canvas) size without changing the size of the image.

✦ Resize images according to the following criteria, all of which let you specify the placement of the image in the frame:

   • Absolute

   • Common

   • Specific

   • Relative

   • Percentage

✦ Scale to specific size, half size, or double size.

✦ PC to Mac and Mac to PC aspect ratio adjustment.

✦ Flip, rotate, or trim the image (by a specific amount across all images).

✦ Change the number of dots per inch (dpi) assigned to an image for printing. If you want a whole series of images to be printed in one publication, for example, you can automatically convert all of them to the correct printing resolution.

✦ Color and exposure controls can be set interactively, using a sample image with full preview. These settings include the following:

   • Intensity

   • Contrast

   • Gamma

   • Hue

   • Saturation

   • Brightness

✦ Channel control enables quick viewing of RGB and alpha channels.

✦ Swap and shift channels from one location to another.

DeBabelizer is also much easier to use because an expert can set up a frequently repeated routine and then save all the settings under a name describing the appropriate job application. At any later time, anyone else can run that set of settings on any set of objects. Of course, this is handy for saving time even if you don't have assistants.

Drawing Programs

You use drawing programs, like most image-processing programs, to create pictures and graphics. However, the graphics that drawing programs create tend to have a cleaner, harder-edged look because their shapes are created by geometric formulas, rather than by freeform pixel mosaics. At first, you may think that these two types of graphics are so different from each other as to be as incompatible as oil and water. However, Photoshop and most other image-processing programs can read vector images and translate *(render)* them to a pixel image. You can then place that pixel image (also called a *rasterized* image) onto a layer and use the power of the image-processing tools and filters to enhance it and to make it look more photographic. For example, you can use the shape from the drawing program as a mask in order to place a photograph inside it. In fact, drawing programs are excellent for making all manner of mask shapes that you can use in your image-processing program.

> **Note** You may wonder why on earth you'd want to use a drawing program when Photoshop and most other image editors have built-in vector drawing tools. The answer is that you can do much more editing, shading, and transparency control in a high-powered illustration program. If you're only concerned with simple shapes, then the built-in tools do a perfectly adequate job.

You can also combine a drawing and a photograph in order to abstract or dramatize the subject. Most important, though, is that you can draw something that was inconvenient or impossible to photograph, bring it into a photographic composition, and then use photographic tools and effects to make it look as though it had been part of the original composition. Lawyers often use this technique in courtroom presentations to show how something may have happened. Advertising companies also use this extensively to combine logotypes or prototype products with a live scene.

Figures 16-2 and 16-3 show an example of how you can use the Star tool in Adobe Illustrator to quickly create a shape that's difficult to draw by hand, and how Photoshop can quickly manipulate the result to look more photographic. Figure 16-2 shows how you can use a Star or Polygon tool to automatically make the star shape, and then how you can fill the star with a circular gradient to make it brighter in the center. Figure 16-3 shows a mask that you can make in Photoshop

from the star shape, which you can then contract and feather for softer edges. You can then invert the selection and delete the contents so that the edges of the star blend with its surroundings. A noise filter adds film grain and you can use the Dodge tool to make the center of the star even brighter. The resultant star can then become one of thousands in a night sky, the twinkle in a diamond, or highlights radiating from the water's surface.

Many drawing programs compete vigorously. Most of them have die-hard fans and all have features that the others don't. By far, the program most used by professional designers is Adobe Illustrator. Other drawing programs that "have the power" are Macromedia FreeHand, CorelDRAW, and Deneba Canvas (which also includes bitmap-editing capabilities).
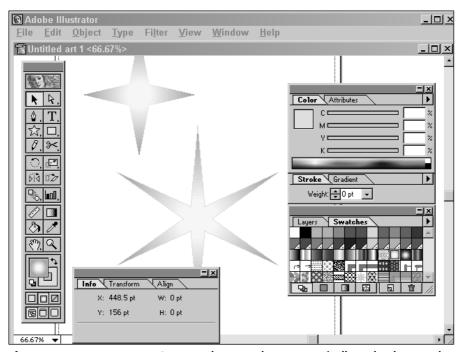
Figure 16-2: You can use a Star or Polygon tool to automatically make the star shape.
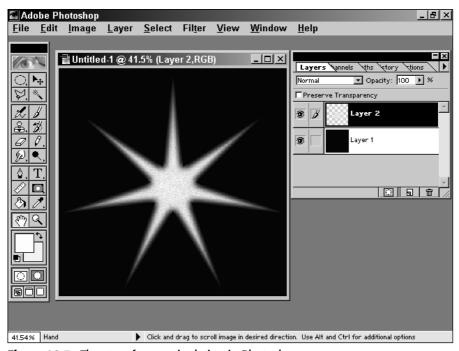
Figure 16-3: The star after manipulation in Photoshop

Vector tracing

Not only can you use drawing tools to create shapes that you can export and turn into "photographs," you can also use drawing tools to turn photographs into drawings. If you're familiar with graphics software, you've probably seen the best-known example of this — the drawing of Hedy Lamar on the cover of CorelDRAW 8.

You can use Adobe Illustrator, Macromedia FreeHand, CorelDRAW, or Deneba Canvas, which also includes bitmap-editing capabilities, to place a photograph on one layer. You can then trace over the photograph using that program's vector drawing tools, as shown in Figure 16-4. To achieve the photograph shown in Figure 16-4, I placed it on a layer and scaled to the size of the drawing, dimmed the layer to make the drawing stand out, locked the layer, and created a new layer for the drawing. I then hand-traced lines over the original. If you aren't a great sketcher, this is a great way to make yourself look like one. It's also a very good way to represent a photographed product as a technical drawing or to make it part of a hand-drawn poster.
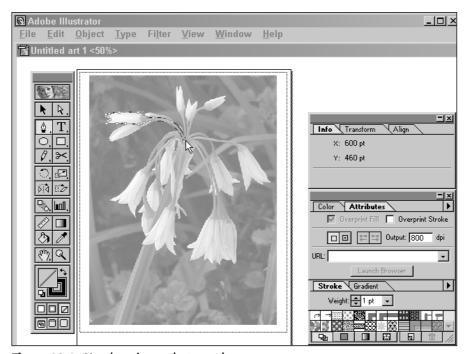
Figure 16-4: Hand-tracing a photograph

You can also use the path tools in Photoshop and many other image-processing programs to create drawings that can be exported as Adobe Illustrator or EPS (Encapsulated Postscript) files to most illustration programs where they can be greatly enhanced.

Auto-tracing

Hand-tracing can produce some beautiful results, but it takes time and practice to achieve results like Corel's signature Hedy Lamar drawing. An alternative is to use automatic tracing, or *auto-tracing*. The most sophisticated automatic tracing I've found is in a standalone program called Adobe Streamline. However, if you already own an illustration program, chances are excellent that it will do a decent job of auto-tracing.

When auto-tracing photographs, it's a good idea to reduce the levels of color in the image. The extent to which you want to do this depends on the final effect that you want to achieve. Also, if you don't want background objects, mask them out before doing the auto-tracing. Both procedures greatly speed auto-tracing and also make it much easier to edit the result. Figure 16-5 shows the same image I started to hand-trace in Illustrator after I'd already masked, color-reduced, and auto-traced it in

Adobe Streamline. I masked the background and then filled it with a solid color, and then posterized the flowers to four colors. Streamline has a full set of curve-editing tools, so you can easily zoom in and hand-edit the auto-traced result, and then use the line drawing in an illustration or presentation program.
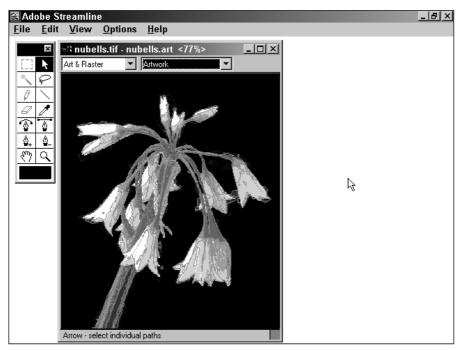
Figure 16-5: The result of auto-tracing in Adobe Streamline

Enlarging Images

Although digital images have pixels instead of grain, you see a similar effect when you enlarge images beyond their intended viewing size. The *intended viewing size* is the size of the image at the best resolution that the output device (printer, monitor, and so forth) can produce. The general rule is 72 dpi for standard resolution monitors and 96 dpi for somewhat higher resolution monitors.

The problem is that this rule limits many of the more affordable digital cameras to print sizes under 8 x 10 inches. What if you want to print your photograph as a large poster, a double-page magazine spread, or as a print for artistic exhibition? How on earth do Nikon, Olympus, and Pentax exhibit highly professional-looking enlargements of images that were taken with 3.3 megapixel cameras? If you've been to trade shows such as Comdex, MacWorld, Photoshop World, PMA, or the Seybold

Conference, you've been seeing such images for years. Up until the time of this writing, the answer has been simple: Use Genuine Fractals Print Shop Pro, followed by some careful noise reduction and retouching techniques in Photoshop. Recently, a new and less-expensive program called S-Spline has given Genuine Fractals some more affordable competition.

Tip You may be able to reduce some of the "grain" noise in an enlarged image by converting the resulting file to Lab Color mode, selecting the b channel, and blurring it slightly (about 3 to 4 pixels is usually sufficient). This procedure often works, but is never guaranteed because the noise generated from adjacent pixels is different in every image. Also, one way to reduce noise in large areas of "nearly flat" color is to duplicate the layer, Gaussian Blur the bottom image by 3 to 5 pixels, and then erase the "nearly solid colors" in the top image, being careful not to erase any sharp edges in the process.

Genuine Fractals 2.5

The most recent and powerful version of Genuine Fractals (since its acquisition by LizardTech) is version 2.5. The most noticeable difference between version 2.5 and earlier versions is a much cleaner and more inviting user interface, as shown in Figure 16-7 (Genuine Fractals 2).

Two versions of Genuine Fractals 2.5 are available: GF 2.5 and GF PrintPro 2.5. Genuine Fractals 2.5 allows you to enlarge digital photos to output any image size from a single file that the program encodes to your choice of a lossless or lossy proprietary image format called STN. You have three rendering choices when you open the file; you also get RGB, Multichannel, and Grayscale image support. The Genuine Fractals PrintPro 2.5 also provides CMYK support, ideal for printing professionals and those who also output to large format CMYK printers that don't automatically translate your existing RGB file to CMYK.

Here's how the program works:

1. **Open Photoshop.**

2. **Use the Photoshop browser to find the image that you want to enlarge.**

   If necessary, rotate the image to the desired vertical or horizontal orientation.

3. **Choose File ➪ Save As ➪ GF Print Pro.**

   The Genuine Fractals Print Pro dialog box opens. Click to choose from the following two options:

   • **Lossless:** This results in no loss of image detail, regardless of whether its perceivable, and thus the STN file is somewhat larger.

   • **Visually Lossless:** This means that although some data is lost, you can't perceive it, and the resulting file is noticeably smaller.

4. Click OK.

Your file is converted and saved just about as quickly as it would be to any conventional format.

To open the file at a different size, choose File ➪ Open in Photoshop. Choose STN from the file type menu, and the dialog box appears, as shown in Figure 16-6.
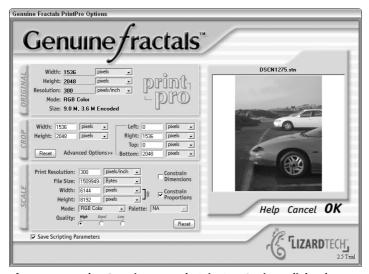
Figure 16-6: The Genuine Fractals PrintPro Options dialog box

Notice that the open dialog box is divided into three parts:

✦ **Original:** This section shows all the specifications in the original file. You can't modify these, but you can specify what units they are shown in.

✦ **Crop:** This section allows you to crop the image to a different width and height, and to either constrain proportions — so you only have to enter one of these dimensions or the other — or to enter the width and height separately. If you click the Advanced options, you can choose where in the image to place the cropping rectangle, but you have to do this mathematically.

✦ **Scale:** This is the most important section. You can change the file size by entering new figures for either print resolution, file size, width, and height. You can also choose the supported color mode to which you want to convert the file. Finally, you choose one of three levels of quality in the enlargement. Moving up in quality increases rendering time.

You can see the result of a 400% increase in file size in Figure 16-7.

Figure 16-7: A 400% enlargement made in GF Print Pro 2.5

S-Spline 2.2

S-Spline is a standalone program for enlarging TIFF, PNG, JPG, TGA, PCX, or BMP format files. The procedure for making the enlargement is much the same as using the Image ⇨ Size command in Photoshop:

1. **Open the S-Spline.**

2. **Open the file that you want to enlarge.**

3. **Select Auto Preview and Maintain Aspect Ratio.**

4. **Enter either a new pixel size or a new percentage.**

5. **Click OK.**

A large preview window shows you the result at 100% over a portion of the image and you can move a cursor in a smaller preview window to choose the portion of the image that will be previewed at 100%. Then you watch the processing thermometer for a few minutes. After it finishes, it saves the file. You have to open it in your image processer to see the result. The S-Spline dialog box is shown in Figure 16-8, and the 400% enlargement of the same portion of the photo shown previously in Figure 16-7 for a Photoshop 7 bicubic interpolation enlargement and a Genuine Fractals Pro 400% enlargement is shown in Figure 16-9.
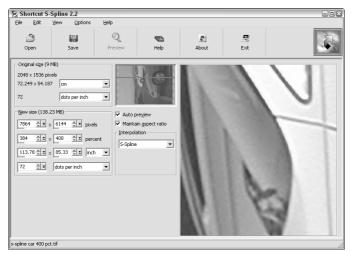
Figure 16-8: The S-Spline dialog box

Figure 16-9: A 400% enlargement in S-Spline

If you look at the previous images, you can see that both the Genuine Fractals and S-Spline image are a noticeable improvement over the Photoshop 7 bicubic interpolation, which has more noticeable granular noise and more jagged edges in slanted and curved lines. All three of these images can be improved through the use of Grain Surgery.

Controlling Grain and Noise with Grain Surgery

Although you can use certain techniques for controlling grain and noise in an image editor, if you really want to take control, buy a new special-purpose product called Grain Surgery. Grain Surgery is a Photoshop-compatible plug-in. It allows you to do one of three things, and it does them all with style and grace:

✦ **Remove Grain:** Not only does it find and remove grain and noise patterns, it re-sharpens and re-smoothes the edges. You can use this mode to greatly improve the result of Photoshop's own bicubic interpolation when an image is re-sized. However, if you want really perfect results, use this program in conjunction with either Genuine Fractals or S-Spline. The result of the combination of Genuine Fractals and Grain Surgery is shown in Figure 16-10.

Figure 16-10: The result of Genuine Fractals and Grain Surgery

✦ **Add Grain:** This mode is used to create either digital noise or add film grain to an image for artistic or interpretative purposes. For example, you may want to make a high resolution studio shot of a dancing model's face appear as though it were shot in a night club with high speed film pushed to the limit. The Add Grain dialog box is shown in Figure 16-11.
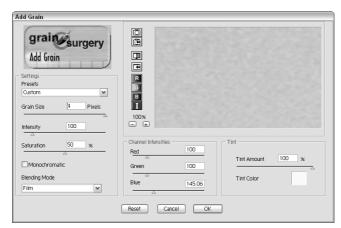
Figure 16-11: The Grain Surgery Add Grain dialog box

✦ **Match Grain:** This Grain Surgery capability is indispensable for the processes of retouching or compositing. You can automatically match the noise and grain pattern of one image to that of another. So if you have done "airbrush" retouching by duplicating a layer, blurring the underlying layer, and then erasing through the top layer — you can then match the grain in both layers so that you can't see where the erasures were made. You can also use Match Grain to sample the grain pattern of one image so that it can then be applied to that of another or to create a new grain pattern that will then be matched in the image. The Match Grain dialog box is shown in Figure 16-12.
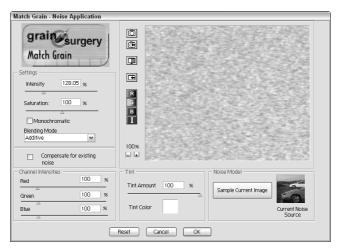
Figure 16-12: The Grain Surgery Match Grain dialog box

Making Panoramas and Object Scenes

Many, perhaps most, of the current crop of digicams come with panoramic stitching software. This category of software knows how to piece together images that were taken by rotating a tripod-mounted camera a regular number of degrees between shots so that the shots overlap by about 20 percent. You may want to piece together three or four frames for a banner-shaped, wide-angle view of a scene, such as a city skyline. You may also want to piece together a 360-degree view of a scene, put it into a QuickTime VR movie, and let a viewer use a mouse to pan and zoom through the scene. Some of this software also lets you encircle an object with a camera, and then it stitches the frames together so that you can use the mouse to spin the object. This second method is known as *object stitching.* I can't possibly show you in the static black-and-white pages of a book just how effective QuickTime VR (and some competitive technologies) can be. If you haven't experienced it, you should. Go to www.quicktime.com and play with some of the examples.

Note Some digital cameras have a panoramic shooting mode, which places a grid or positioning diagram on the LCD screen so you can keep the center of the picture aligned as you rotate, and the point of overlap is at a consistent distance from the edges of each frame that make up the panorama. If you plan to shoot many panoramas, look for this feature. It's extremely helpful.

Although QuickTime VR movies are the most common use of stitching software, you can also use it for piecing together vistas that your camera simply can't shoot with the lenses that you own. Most stitching programs will (and should) let you stitch together less-than-360-degree panoramas from a left-to-right sequence of shots. You should then be able to save the results to a standard file type (preferably a non-lossy format), open it in your favorite image processor, and crop and retouch it. Most of today's color printers print to any length, so you can make large panoramas with your inexpensive desktop inkjet. Some stitching programs, such as Roxio's Photovista, create panoramas that can be run as Java applets on the Web or that can be played in Real Audio's RealSpace format.

Many current image editors come with built-in capability to stitch together images in many up-to-date versions of image-editing software. Take a look at the features of various image editors described in Chapter 10 for more information.

Taking panorama photos

In order to take panoramic photos, you must have some means of keeping the camera relatively level and of panning it at the camera's *optical center* (roughly halfway between the outside of the front element of the lens and the film or sensor's front plane). Otherwise, objects in the foreground won't move in the same relative position to objects in the background as the camera is rotated.

Only one brand of digital cameras (at the time of this writing) makes it easier to take panoramas by hand. Most Canon digital cameras have a panorama mode that asks whether you're going to shoot the panorama from right to left or left to right. Then, when you press the shutter button, the LCD image slides in the direction that you specified until only about 20 percent of the frame is still showing. That 20 percent then becomes roughly 50 percent transparent, so when you pan the camera, you can precisely align the 20 percent overlap of the next frame with the 20 percent overlap of the next frame. When you snap the picture, the frame moves to the position that lets you overlap the next frame.

If you don't own a Canon (people who run a business or have a hobby based primarily on shooting panoramas may find it worthwhile to buy one), then you must use a tripod with a pan head that has a bubble level and is clearly marked for 360 degrees of rotation. Make sure that the head is exactly level, and then rotate the camera about 15 degrees for each shot. The more wide-angle your lens or zoom factor, the more degrees of rotation you may be able to get away with; at more than 30 degrees, however, your panorama software may have a tough time making the left and right edges match.

You start with the camera and tripod absolutely leveled and aimed at the center of what will become the panoramic scene. If your camera has a Panorama mode, use it so that the camera doesn't change exposure as you pan. Otherwise, simply put the camera in Manual mode and then change the f-stop and shutter speed until what you see on the LCD screen looks like what you want to take home. Take along a black jacket (fleece jackets are ideal because they're light and opaque). Now for the bad news: If you don't lock your exposure, if you aren't leveled, and if you don't pan with precision — especially if your stitching software is unforgiving — you'll end up with something really ugly like the image shown in Figure 16-13.

Figure 16-13: A badly exposed panorama after an attempt at stitching

Tip

You can do a bit better than the example in Figure 16-13 if you forget to put your camera in Manual mode before you shot the panorama. Before you add the images to the panorama software, open all of them at the same time in your image editor. Then use the same auto-correction command (auto-color in Photoshop Elements) on each of them. Then use the Levels command or the Brightness/Contrast command to make them all match as closely as possible in overall brightness. Finally, add them all to the panorama software and make the panorama. You can probably retouch some mismatches with the Clone tool and even other tonal areas with the Burn and Dodge tool.

The best and least expensive way to ensure that you achieve precise rotated panoramic images is with a tripod pan head made for the purpose, such as one made by Kaidan, Inc. Kaidan makes units for all sorts of cameras and panoramic application — including a couple that are adaptable to multiple cameras. The quickest way to learn what Kaidan currently produces is to visit its Web site (`www.kaidan.com/products/pano-prods.html`). You can see the universal Kaidan head that I use in Figure 16-14.

Figure 16-14: A Kaidan panorama head

Photoshop Elements

If you're a Photoshop Elements user, you already have a pretty decent panorama composer at your disposal. Follow these steps to make a 180-degree (well, maybe it's only 160 degrees) panorama that you can print:

1. **Place all the files you want to use for the panorama in a single folder.**

   Opening and organizing your files is easier if you decide to do more than one version of the panorama.

2. **Open Photoshop Elements.**

   If there's any chance that the shots that will make up the panorama aren't evenly exposed, follow the advice in the Tip in the last section.

3. **Choose File ➪ Photomerge.**

   The Photomerge dialog box opens, as shown in Figure 16-15. If you want to make a panorama that's smaller than the panorama in the original, choose a percentage from the Image Size Reduction menu.
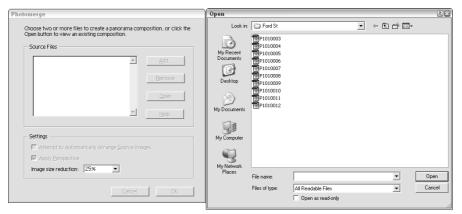
Figure 16-15: The Photoshop Elements Photomerge dialog box

4. Open the folder that contains the panorama files.

If any files are out of place in the panorama, remove them, and then highlight all the remaining files. Their names should all appear in the File Name field.

5. Click the Open button.

Each file is opened in sequence, and then reduced to the appropriate size for the panorama. Then, with no further prompting from you, the second Photomerge dialog box appears, as shown in Figure 16-16. You see each of the pictures in your panorama aligned in the image dock at the top of the screen. If they aren't in order, you can drag to change their position. You can start the panorama at either end. Because left to right usually comes more naturally, I usually start from the left.

6. Drag the photo into the main workspace, which is the large white area at the bottom left of the dialog box.

Continue dragging each subsequent photo into place. If some lines won't match, try dragging the pictures back to the well, clicking the Perspective button, and starting from the center. This technique seems to work much better with panoramas that have lots of straight horizontal lines that must join smoothly. I used this technique for the Ford Street Studios panorama shown in this exercise.

7. After you have all the individual photos placed, click the Preview button.

8. If you're satisfied with your preview, click OK.

The complete image appears in a document window in Photoshop Elements. Use the Crop tool to trim the image, as shown in Figure 16-17.

Figure 16-16: The second Photomerge dialog box

Figure 16-17: The panorama after being cropped

ArcSoft Panorama Maker

Unfortunately, one of the most versatile and easiest to use panorama programs, QuickStitch, is no longer being published. However, ArcSoft is just now bringing to market a new program called Panorama Maker. Panorama Maker stitches together images in rows and columns or as an end-to-end panorama that can be either vertical or horizontal. Therefore, you can use it to either greatly increase the resolution of your digicam or to enable it to take shots that simulate the use of an extreme wide-angle lens (up to 180 degrees of coverage).

This program automates technical details, such as specifying camera lens focal length, knowing where to join images, matching exposures from frame to frame,

and performing ghost elimination and automatic cropping. On the other hand, you can always exert manual control over any of these features. You have numerous options for output resolution, you have a choice of three levels of VR compression, and you can choose the size of the viewer window.

Roxio Photovista Virtual Tour

Roxio's Photovista Virtual Tour is a redesign of one of the first and foremost panoramic stitching programs. This panorama software is just as easy to use as QuickStitch 360. Its weakness is that you can't save your panorama to a lossless format, such as TIFF, so if you have to edit the JPEG stitched image, you lose some quality. In fact, this program is really meant for stitching panoramas that will be used on the Web for setting up a "virtual tour." For this purpose, this program just can't be beat. This program is really a package of programs: PhotoVista Virtual Tour (for linking various files together so you can "tour" several locations and view 3-D objects close up), PhotoVista (the panorama program), and PhotoVista 3-D Objects (which lets you rotate 3-D objects in space). This section of the book covers only the panorama-making capabilities of this suite of programs, but you can learn all about the other two modules by visiting the MGI site at: www.mgisoft.com/products/webtools/virtual/index.asp.

All of PhotoVista's commands are represented by icons. To load the frames, you use a browser-like dialog box to choose files and add them to the list. Then you drag them to sort their order. When you click OK, the pictures appear in order in the workspace, as shown in Figure 16-18. At the time of this writing, the complete Virtual Tour package was selling for right around $249 on the MGI site.

Figure 16-18: With PhotoVista, choose a few options in the dialog box, click the Full Stitch icon at bottom center, and your work is done.

PhotoVista Virtual Tour does an excellent job of exposure correction and seamless stitching, even if the camera isn't on a tripod and the spacing between shots isn't exactly regular. You just try to leave about a 20 percent overlap. One of the biggest problems in shooting panoramas with point-and-shoot cameras is that they can set very different exposures for different frames. The result can be very obvious seams between frames.

Note Cameras that have a Panorama mode generally lock the exposure of all the frames in the panorama to match the exposure chosen for the first frame. This prevents the camera from automatically changing exposure when the camera is rotated to face the sun (or a dark wall). If your camera doesn't have a Panorama mode, use a fully manual mode to set the exposure so that it doesn't change automatically as you pan.

Stitching a High-Resolution Matrix

A few programs, such as ArcSoft Panorama Maker (described previously in the chapter), can stitch together a "grid" of photographs that either creates a very wide-angle lens effect or a very high-resolution picture.

If you want to create a high-resolution picture, you don't really need a specialized program. You need to move the camera at regular intervals to shoot the pictures in each row and column of the grid. You place all the images into your image editor, enlarge the canvas to accommodate each picture in the grid, and then drag each layer to overlap the pictures. Move the layers until each image is perfectly aligned from side-to-side and top-to-bottom. You then restore each layer to 100 percent opacity and flatten the layers into a single picture.

The real trick is in taking the pictures. You have to be properly equipped with a camera, a small bubble level, a tripod, a measuring tapel, a ball of string, and small bricks to hold the string in place. Additionally, before you take the picture, you must set the camera up and turn on the LCD so you can see exactly what the lens sees. Follow these steps to ensure that you take pictures that will make a good panorama:

1. **Place and brace the camera so it is exactly at the center of what the lens sees.**

2. **Zoom your lens to full telephoto.**

3. **Place your camera on a tripod.**

   Move it so that the center post is exactly halfway up and the legs are collapsed enough to let you move the camera where the center of the picture will be. Then extend the legs to meet the ground and level the camera using the bubble level. Mark the center post at the exact place where it meets the tripod platform.

4. **Lower the camera one full frame and make a mark on the center post.**

5. **Use your tape to measure the distance between the two marks and then make equidistant marks up and down the center post.**

6. **Stretch the string across the LCD so that it stays in place when you move the camera.**

   You need to do this once when you move the camera vertically and once when you move it horizontally.

7. **Measure the amount of horizontal movement needed for each frame.**

8. **Put a pair of light stands or tripods on either side of the camera and tie a string so that it crosses behind the LCD monitor.**

9. **Mark the center point of the first frame on the string (a black magic marker is good for this).**

10. **Move the camera to the right so that the image just overlaps by about 10 percent on the left side.**

11. **Mark the center point on the string.**

12. **Take your measuring tape and measure the distance between the two marks.**

13. **Measure the same distance to the right of the second point and make another mark.**

    Keep this up until you've marked about seven or eight points on either side of the center point.

14. **Place the tripod and raise the center post to the exact center point.**

15. **Move the camera to the center point of the scene that you want to shoot.**

16. **Stretch the string so that it is exactly parallel to the LCD monitor and position it so that the center mark is aligned with the center leg.**

17. **Take a picture at each marked position of the center post.**

18. **Move the tripod one string mark to the right, make sure the LCD is perfectly parallel to the string, and take another picture at each marked position of the center post.**

19. **Repeat Steps 15 through 18 until you've taken pictures for each cell in the grid.**

3-D Programs

If you have — or can get your hands on — a 3-D modeling program that does ray-traced rendering, you can create photo-realistic product prototypes that you can composite into a photographic background. Working with a digital model rather

than the real thing provides an immense advantage, because it allows you the flexibility to alter the camera's distance, point-of-view (POV), lens focal length, and the angle and quality of light falling on the subject. Working in a 3D model makes it much more likely that you'll be able to match the position of the item to the host photograph. The scene shown in Figure 16-19 is composed of a digital camera snapshot, a 3-D model of an alien that was "lit" to match the on-camera flash used in the snapshot, 3-D lettering created in another 3-D program, and a 3-D landscape used as a background and foreground. All these components were pieced together in Photoshop 5. Notice how the photographer was able to position the alien's hand so that it wraps around one woman's shoulder.

Figure 16-19: Francisco Rivera modeled the alien in Lightwave 3-D and snapped the photo of the two women with a Kodak digital camera.

If you don't have a lot of experience with 3-D modeling, you'll want to start with simple shapes and relatively inexpensive programs. Programs such as TrueSpace 4 (Windows only, $595) and RayDream Studio (Mac and Windows, $300) can do incredible things for a fraction of the price of professional modeling tools. Some of the special purpose 3-D programs that I discuss in the next section may also work for the purposes you have in mind. However, if you have a corporate budget and an engineering or illustration staff that's already familiar with high-end 3-D programs, you have more options. You can create anything, put it into a photograph, and manipulate it to look absolutely real by matching the color balance and film grain, and adding a little atmosphere and dirt.

3-D modeling programs are also extremely useful for creating "sets" for use as backgrounds in digital photographs. These programs are especially good at creating interior scenes. You may think that interiors take considerable time to model and

light in a realistic way—and you are right. However, libraries of interior scenes are available that you can simply "decorate" with additional furniture, atmosphere, and lighting. You can also easily change the fabrics on furniture or the color of walls, which allows one virtual 3-D set to serve as the background for many different photos.

Another use for some 3-D modeling programs is creating atmospheric conditions such as smoke, fog, rain, and fire. Usually the best way to accomplish these effects is to project your photos onto flat surfaces within the model and then create the atmosphere within the model. Then you simply render the finished result as a bitmapped file, which you can edit further in any image-processing program by performing tasks, such as cropping down to the original scene.

Special-Purpose 3-D Programs

MetaCreations originally made three programs that are unique in their capabilities: Canoma, Poser, and Bryce, which are each now made and sold by a different company. For all the modeling prowess these three programs provide, their price is kept at an affordable level:

✦ **Canoma:** This program is now owned by Adobe, but has not yet been re-released and is not presently for sale. However, because Adobe bought and paid for the program, it will probably soon reappear in some form. In the meantime, you may want to contact Adobe for further information. You can also find out more at `www.canoma.com`.

✦ **Poser:** This program is now sold and distributed by Curious Labs (`www.curiouslabs.com`) and sells for $219. Numerous new and powerful features have been added.

✦ **Bryce:** This program, which is now sold and maintained by Corel, sells for $299. Bryce now has network rendering, so you can generate very detailed and complex scenes in minimal time by doing the rendering on several networked computers. Other new features are new Light and Tree labs.

Canoma

Canoma uses a new interface to make it easy to turn a digital photo into a 3-D model. You can even stitch images together in QuickStitch to get the wide-angle perspective necessary to see the entirety of a small room. The photograph is opened in Canoma and shapes are traced around the objects in the scene in such a way that the program understands the height, width, and depth of the traced items. It then becomes possible to move the "camera" around the objects in order to see objects from all points of view. Canoma also features an Image palette that you can use to hold a series of photographs containing details of the scene to be modeled. These details can be used as surface textures for the objects in the scene. Thus, it becomes possible to create truly photographic models of 3-D objects from digital photographs. The resulting model can be placed on a Web site or in a CD-ROM presentation.

A viewer can then take a virtual stroll, for example, through a house for sale. You can use the same technique to show used products on a Web site.

You can also export Canoma models to other 3-D software and use them as the basis for making whole new models as backgrounds, as described in the section "3-D Programs." Canoma exports to the following industry-standard formats: MTS, WRL, OBJ, PP2, SCN, and DXF. Bitmap images can be exported to image-processing software in BMP, JPG, PSD, PNG, and TIFF formats.

Canoma is a program that lets you build 3-D models directly from your digital or digitized photographs. If you want to put package designs on the Web, you can easily create a 3-D movie that shows the box from all sides. As shapes become more complex, it gets a bit more complicated. The next best application is architectural views in which the scene consists mainly of straight-edged buildings. You can probably create a model of a basket full of fruit or a crowd of people, but it may take quite a bit of trial-and-error practice. On the other hand, using Canoma to create a 3-D scene is far easier — especially if you're not accomplished with 3-D modeling programs — than working in a conventional 3-D program.

Here are the basics of how it works: You start with an ordinary 2-D photo (a box on a desktop is the example used in the program's basic tutorial). You pin the corners of a box shape to the box, as shown in Figure 16-20.

Figure 16-20: The Canoma interface. You can see the first box being pinned to the edges of the box in the photograph.

In the photograph, you can see three sides of the box; so three sides are mapped to the 3-D object. You can then more or less instantly move and rotate the object so that you see the box from different perspectives. Of course, if you turn the box too far, you see that the back and right side are blank. Also, if you zoom in too much, and turn the box too far, the picture details can get pretty mushy unless your original picture was fairly high-resolution and shot from a straight-on angle. This isn't a problem — provided you take your time. You can shoot the sides of the box independently and at a higher resolution, and then "pin" them onto the model in another series of steps. To build the rest of the scene, you keep adding *primitives* (the simplest geometric shapes, such as rectangles, ovals, and polygons). You pin the primitives to the shapes in the photograph and then add supplementary photos to the backs and sides of all the shapes. In Figure 16-21, you can see the result of adding a photo of a gray card as a ground plane, rendering all the assigned textures (which is as quick as clicking a button), and then rotating the image. Note how quickly this 3-D model was built from one still photograph.

Figure 16-21: A 3-D model built from one photo; you can add additional photos to fill in the blanks.

The more photographs you have of a scene, the more realistic and complete your finished 3-D model will appear. Now, if your scene includes trees, people, and a lot of other organic shapes, you definitely have your work cut out for you. Canoma is a terrifically useful product, but consider whether it is practical for the project that you have in mind before you jump into it.

After you make the model, you can make movies by clicking a few icons in the recording bar to designate keyframes and then render a movie. You have a choice of rendering the movie as either a QuickTime file or as individually sequenced PICT files. If you choose to render a sequence of still images, you can drop the still images into many other animation programs and GIF animators.

Canoma isn't exactly a casual purchase at $469, but it can pay for itself pretty quickly if you have an application that demands fast 3-D visualizations of physical sites, architectural models, or products.

Poser 5

Poser creates 3-D models of human figures and, as of version 3, animals. You can use the program to create people for crowd scenes, to populate a static photograph, or to place an animal or two in a farm scene or backyard. As with many 3-D models, the program may generate models that are a little too smooth and perfect, but that shouldn't stop you from being able to take advantage of them. Just pick the sex, age, and body type of the model that you want. Then use one of the preset poses and adjust it to suit your exact positioning requirements. Light it and place the camera at the desired point-of-view with a lens focal length that matches your target photo. Finally, export the figure as a 2-D object against a solid background that contrasts with the figure and its clothing. This makes it easy to mask the figure so that it can be composited with a target photo. Place the figure on its own layer in your image-processing program and then adjust color, exposure, and grain to match the target image. If necessary, you can add real faces and hands or retouch details by hand.

Of course, you can also add figures to your digital photos by shooting real people under controlled conditions in a studio. However, if you need several types of people, you have to find them and arrange appointments. Depending on your use of the photo, you may also need model releases signed, which can cost you money. Finally, you may need poses that are dangerous or impossible to achieve with a real person or animal.

Poser lets you create people and animals in any pose you want, after which you can dress them in any way you want, and then light them and "shoot" them from any angle you want. You can then place your photos into the application as backgrounds for the people and animals, or you can put the people and animals into your photos. Figure 16-22 shows you what the Poser interface looks like, as well as what a fully rendered figure looks like.

Figure 16-22: A fully rendered Poser figure

I need to mention a caveat, however: Poser's people and animals don't look photo-graphically realistic unless they're placed at a distance or "dirtied up" with some of the tools in your image editor after they've been composited into the image. They do work very well, however, when you have a beautiful scenic that needs a silhouet-ted figure gazing into the distance or standing on a far-away hilltop. Poser figures are also a good way to add people to crowds.

I've also found another use for Poser that helps a great deal in studio setups. You can model a studio and some reflector panels, place a Poser model in front of the background, and then place various lights in the picture. You can then adjust the brightness and the type of the lights until you see exactly the effect you want in the rendered model. Then you know exactly how and where to place your lighting for the studio shot. You can even place 3-D models of such props as tables, cars, or sofas on the set. Just use the stock model libraries that are created for such 3-D modeling programs as Light Wave or 3-D Studio.

Tip I've also found that Poser is enormously helpful in designing or "storyboarding" a real shot. You can place the figures where you want them and in attitudes that enhance the composition and story, lighting them to create the needed drama. Then, in order to get the models to understand what you're after, all you have to do is show them the finished scene.

If you're familiar with Poser, but haven't yet seen Poser 5, you're in for lots of pleasant surprises. You can change skin colors and other ethnic looks, facial expressions, hair, and clothing. You can morph parts of bodies to give them unusual proportions or special characteristics, such as a fat boy, a space alien, or a soon-to-be mom.

Bryce 4

Bryce creates amazingly realistic 3-D landscapes, complete with atmosphere and weather. You can use Bryce to create amazing backgrounds for photographed objects or to create custom skies for scenes that may otherwise be dull. I find the program's ability to create skies practically indispensable. You can create exactly the sun angle that you need to match that of your photo and you don't have to spend hours searching through stock photo libraries.

Bryce is nearly as useful for creating landscapes. For example, you can use it to create the backgrounds for an entire outdoor clothing catalog. The latest version of Bryce has improved its capability to create landscapes and skies in some important ways. First, it offers a "sky lab" that makes it possible to interactively control the type of clouds, cloud layering, atmospheric conditions, sun position and angle, and many other factors. Second, you can import U.S. Geological Survey surface maps and create the actual terrain of nearly any place in the country. Take a look at the example shown in Figure 16-23; not a single thing in it is actually real.

Bryce landscapes can be very useful for creating dreamy or glamorous backgrounds for objects that must be shot in ordinary settings. You can place the viewpoint for any Bryce landscape anywhere you want, so you can actually use a single model as the location for many different backgrounds. To better picture this, imagine the different backgrounds you can get for a fashion shoot by moving around inside Yosemite Valley.

You can also place masked photos into Bryce, which makes it easy to match people, buildings, and other photographed objects with a background. After you have placed the objects in the scene, you can then move the camera to the angle that shows the desired perspective and point of view. Furthermore, you can make the imported photos to cast natural shadows.

Figure 16-23: This photographically realistic landscape was entirely generated on the computer.

The drawbacks to Bryce are resolution and rendering time. You can designate the output resolution to anything you want, but if you want a scene that will fill a magazine page, you'd better have a very fast G4 or dual-processor computer, have lots of RAM, and be ready to go to the movies while you're waiting for your result.

Fortunately, you can do quick rendering while you're working, and you can interrupt it at any time if you decide you want to make a change. This means that you don't have to wait for the long, high-resolution renderings until you're ready to commit yourself to the final (or near final) result.

Bryce 5 has even better sky rendering capabilities than earlier versions—and those were fantastic. Although Sky Effects in KPT 5 is much faster, Bryce is that much more capable of drama.

I mentioned previously that you can use Bryce landscapes as backgrounds (not to mention scenery on the other side of a window in an interior shot). You can also use photos in Bryce either as cutouts to place in the scene or as textures for mapping onto any of Bryce's geometric primitive shapes. When you use a photo as a cutout, you can match the time of day, angle of the sun, and cloud conditions to those of the photograph, so the photo really looks like it belongs in the 3-D space. That is, it looks like it belongs as long as you turn it to face the camera. Because the photo is actually 2-D, placing it at an angle to the camera makes its flatness apparent.

Making Photo Mosaics

Photo mosaics are pictures that look like each pixel is a photograph within a photograph. The easiest way to make photo mosaics is to use an inexpensive program that was designed for the purpose. Some inexpensive image editors, such as MGI Photo Suite, even have the capability built-in.

To make a photo mosaic in MGI PhotoSuite, you simply open the image that you want to interpret as a mosaic and then place as many photographs as you want into a library. You then tell the program how many images you want to have in your mosaic by dragging a slider. The number of images has to do with the *resolution* (that is, the number of photos used to comprise the matrix that defines the appearance of the picture). When it comes to the number of different pictures actually used, PhotoSuite makes its own choices based on items such as the aspect ratio of the pictures in the library, their lightness or darkness, and other qualities. You have no choice in the matter.

After you've made these choices, click the Create button. The interface changes to let you watch the Tapestry (photo mosaic) being created. Then you simply save the file to your preferred format. The MGI PhotoSuite's PhotoTapestry interface is shown in Figure 16-24.
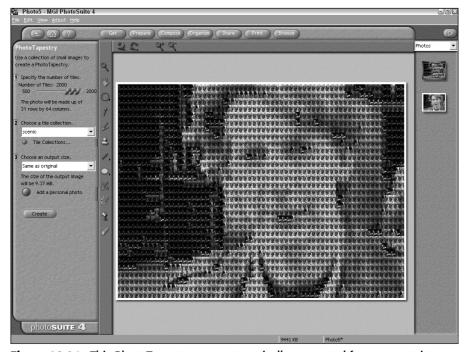
Figure 16-24: This PhotoTapestry was automatically generated from a portrait of a friend's face.

Making Small Movies

The majority of today's digital cameras—especially if they cost more than $300—can make small movies that are useful for grabbing attention on a Web site or for use in an instructional presentation to show how to do a simple process, such as inserting a card in a PCI slot in a computer. These movies typically run at a slower rate than real video and are typically limited to frame sizes of under 640 x 480 pixels.

Digital still cameras can do an adequate job of capturing short Web movies. Some save the "film" as a QuickTime movie (more widely supported on the Web); others as a WMF (Windows Media File), which is also widely supported on the Web.

Digital video cameras make beautiful video and the more professional models are even being used more and more to shoot theatrical films. (At least one of these was in the running for an Academy Award this year. So don't laugh!). Some models of video cameras can even capture high-resolution stills, but most of the still captures are worthy only of low-resolution use.

However, here's the problem: Most digital cameras don't provide you with any way to edit these movie-ettes. At the very least, you almost always have a few frames that are out of sequence. You may also want to edit several of these small movies together so that you can tell a bit longer story. However, most any of the low-cost movie editors and all of the premium movie editors, such as Adobe Premier and Apple's Final Cut Pro, can solve this problem with ease.

Ulead seems to have the most popular of the "quick and easy" video editors meant for home/small business use. Editors in this category seem to be the ones best suited to managing movies shot from digital still cameras as well as for "stealing" still frames from real digital video movies for use as stills.

Capturing Stills from Video

Video cameras can do some things that still cameras either can't do or won't do well. Two examples of this are extreme telephoto shots (most current camcorders have a 10:1 or better optical zoom with steady-cam capabilities), and photography in extremely low lighting conditions. Don't be misled, though: You are definitely not going to get the resolution that's possible from your cool new Coolpix 5000—not even close. You will get a picture that neither the Coolpix nor any other camera that costs less than $2000 can get in such dim light. You may also get a feeling of motion and energy that's hard to replicate with a still camera when shooting under the kind of conditions that would produce a picture. Incidentally, older S-Video cameras are generally even more sensitive in low light conditions than are digital video cameras.

In order to capture stills from video, you need to do one of two things:

✦ Have a video capture card and editing software that lets you stop at a frame and record it. (Most any video-editing software can do this.)

✦ Use a display card such as ATI's All-in-Wonder series that lets you view the playback directly from your video camera and then click a camera icon that records a still image. Then just play the video until you see something you want to capture and click. The series of photos shown in Figure 16-25 were all captured by this method. They were shot at a nearly dark New Year's Eve party staged by The Anon Salon in San Francisco.

Figure 16-25: These photos were all taken from videos shot in a nightclub atmosphere on New Year's Eve.

The advantage of using a video-editing program for capturing stills is that you can see a thumbnail of the exact frame that you want to capture, so it's much easier to capture the precise moment that something happened.

Stereoscopic Images

You can use your digital camera in two ways to take *stereo pairs,* which are nearly identical frames except that they are taken at approximately the same distance from one another as the distance between our left and right eyes. One way to shoot a stereo pair is to rig a slider bar that lets you move the camera the right distance, which is typically about 4½ inches when shooting a subject whose *near point* (the closest point that's visible in the frame) is 6 to 9 feet from the camera. Table 16-1 gives you an idea of how far to shift the center of the camera lens if the focal length equivalent is 50mm. If your lens is shorter, divide the distance by the result of dividing the focal length equivalent into 50mm.

Table 16-1 **Shooting Stereo Pairs**	
Nearest Object	*Distance Between Lens Centers*
3 feet	0.75 inches
6 feet	1.5 inches
11 feet	3 inches
23 feet	6 inches
45 feet	1 foot
90 feet	2 feet
180 feet	4 feet

To rig a slider bar, pop down to your nearest metal working shop and have them cut you a metal bar with a long slit that's just wide enough to hold a tripod thread screw. Also have them drill two holes: A threaded one at the very end of the bar so that you can attach it to your tripod head; the other at the end of the slit that's large enough to slip a second tripod screw through it so that you can slide your camera from side to side. The drawing shown in Figure 16-26 gives you the idea. The bar should be thick enough that there's no danger of its bending, but thin enough not to bind the tripod thread screw.

Tip   You can make the bar long enough to hold two cameras side-by-side, in which case you need three tripod screws.
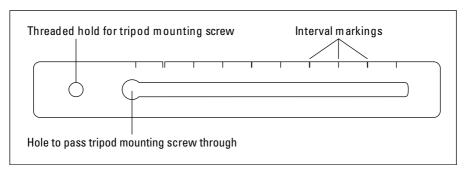
Figure 16-26: Show this sketch to your metal working shop.

Stereo images don't require a camera with much resolution. Anything over 1 mega-pixel is more than adequate for most purposes because the best and most popular means of viewing the pictures is by printing a stereo pair. Although you can make exhibit-size stereo pair prints from higher resolution cameras, you then need to provide each viewer with either the training to stand at the right distance in front of the two prints and then to see the pair in stereo or give them a pair of stereo lenses that will allow them to view the pair as they go through the exhibit. You can do this by tethering the lenses to the wall under each print. The viewer can then stretch the glasses to the end of the tether in order to be the right distance from the prints.

To get the two cameras to fire at the same time, it's best to use cameras that have a remote control. You can then fire both cameras with the same remote control so that they both fire at the same instant.

For private viewing, the method I find most practical for use with digital photographs is one that lets you make the prints so that they'll fit in the slide viewer shown in Figure 16-27.

To take the photographs, place the camera in Manual exposure and Focus modes. Then set them so that focus and exposure are identical for both cameras. Otherwise, the two shots may not match and you won't be able to see the stereo effect.

Shooting with a pair of cameras mounted side-by-side allows you to photograph things that move, such as people and pets. You will need cameras that can work with a remote control

Figure 16-27: A stereo print viewer. You can slide the mounted prints closer to and further away from the eyepiece until the eyes see them as a single 3-D image.

If you shoot with a pair of cameras, you need to use identical cameras. Mount them on brackets similar to those shown in Figure 16-28 and Figure 16-29. Once again, show these to your local metal working shop. They should be able to duplicate the functionality of these brackets. A company in Mountain View, California called Jasper Engineering (1240 Pear Ave # A, Mountain View, CA 94043, 650-967-1578) sells these stereo mounting brackets. You can find out much more, including the very reasonable prices of its products, by visiting the Web site at www.stereoscopy.com/jasper/slide-bars.html.

Figure 16-28: The Olympus 3030 cameras, mounted side-by-side for stereo photography

Figure 16-29: The Olympus 3030 cameras, mounted vertically and side-by-side for stereo photography

Because the pictures needed for most stereo viewing situations are square (usually about $3\frac{1}{2}$ inches), it doesn't matter whether the cameras are mounted vertically or horizontally, except that when you mount them horizontally the lens centers can be closer together, which works better for subjects that are closer than 6 feet from the camera.

Finally, if you practice enough, you don't need brackets at all. Roger Mulky shot this stereo picture using only one of his Olympus cameras. He saw this location at a time when he didn't even have a tripod. He simply put the camera in manual focus and used manual exposure. He used the horizontal line formed by the floor tiles to make sure that the camera was level and perpendicular to the scene. Then he took two shots roughly four inches apart from left to right. The result is shown in Figure 16-30.

Figure 16-30: To see this picture in stereo, focus your eyes at infinity and hold the page parallel to the plane of your eyes. Then move the book slowly closer and further away until you see the pictures in stereo.

If you want a little more assurance that your photos will match, use the knotted string technique that I described for making stitched mosaics. Tie the knots at the appropriate distance apart for the distance of the closest object. Then lay it on the ground with a couple of rocks or bricks to keep it stretched apart. Shoot one picture at the position of one of the knots, and then move it over at the appropriate distance for the closest object in your picture.

Tip   Be sure that the closest object in your picture doesn't extend past the edges of the intended frame.

To prepare your stereo shots for printing, follow these steps:

1. **Open both images at the same time in an image editor that features layers.**

2. **Open a new image that is about 4 x 6 inches at whatever resolution you want to print at.**

   I recommend 240 dpi for most Epson inkjet printers, even if the printer is printing at a nominally higher horizontal resolution.

3. **Resize your camera images so that they are just slightly smaller than that dimension and place them each on a separate layer in the program.**

4. **Temporarily reduce the opacity of the top layer so that you can see through to the bottom layer.**

5. **Now drag the top layer so that the object in the dead center of the frame is in perfect register with the object in the dead center of the frame below.**

6. **Return the opacity of the top layer to 100%.**

7. **Trim the image, with both layers in register, to $3\frac{1}{2}$ inches square.**

8. **Duplicate the image.**

   If the top layer is the left image, flatten one of the images, and save it under the name of the picture followed by the letter *L* (for Left).

9. **In the second duplicated image, throw away the L (top) layer.**

10. **Then save the image under the same name, followed by an *R* (for right).**

11. **Print each image and mount them side-by-side.**

12. **Get a stereo viewer or a pair of inexpensive optical stereo glasses and show your pictures to all your amazed friends.**

This is one of the simplest and most effective ways of shooting and presenting stereoscopy with a digital camera. If you become totally fascinated with the subject or need to have 3-D pictures taken, contact my neighbor, Roger Mulkey, by e-mailing him at `Roger@mulkeyvision.com` or check out the Stereoscopy Web site in its entirety (`www.stereoscopy.com`). You can read an excellent and more detailed article on the site about how to build your own equipment for shooting stitched panoramas.

Infrared Photography

Some digital cameras are sensitive to the infrared (or near infrared) spectrum of light. Generally, the manufacturers of such cameras won't tell you if this is the case, because infrared-sensitive cameras can see through clothing if they're equipped with the right filters and if you can throw enough light on the subject. Sorry, but this section isn't going to tell you how to surreptitiously remove clothing. You can see a great example of an infrared photo taken by Roger Mulkey in Sydney, Australia in Figure 16-31.

Figure 16-31: The Sydney Opera house becomes even more the center of attention when seen in infrared surrounding in this photo by Roger Mulkey.

However, infrared photography can bring a unique beauty to many types of subject matter, most notably, landscapes that have lots of vegetation that turns near-white and blue skies that turn near-black. The further beauty of doing it digitally is that you don't have to switch film to shoot infrared. Film cameras have to use infrared film in order to do infrared photography.

Manufacturers won't tell you if their cameras are infrared-sensitive, but you can find out by experimenting. Just get an infrared visible red cutoff filter (the Kodak 89A is one of many that works well). Place the filter in front of the lens and look at a blue light source through the camera's LCD monitor. If you can see a small speck of light glowing through surrounding blackness, the camera is sensitive to infrared light. Another way to determine whether a camera is infrared-sensitive without having to first buy a filter is to use your infrared TV remote. Turn on the camera LCD monitor, point the remote directly at the center of the lens from a few inches away while looking at the LCD, and click the remote. You should see a brief blink of light.

Some near infrared filters require more exposure compensation than others, so you may want to have different types for different shooting situations. The following filters are good candidates:

Remote-controlled photography

You may want to shoot photographs from high in the air, but simply can't afford the price of hiring a pilot to fly you to the exact vantage point from which you want to view the subject. The solution is to mount a lightweight digital camera onto a remote-controlled kite or model airplane. You may also want to shoot from an extraordinarily low viewpoint, in which case you can place your camera in a model truck. Ideally, you also want some way to see (at least, approximately) what the camera sees and to be able to remotely control the moment the shot is taken and the angle of the camera. Changing the angle of the subject can also control the angle at which the photograph is taken, especially if the shot is from a model plane or (better yet) helicopter.

For the most part, you have to spend a pretty fair amount of money to build your own model airplane, make a cradle that can rotate and spin the camera, purchase remote controls that can control the camera, the vehicle (kite, plane, copter, or car), and the shooting angle of the camera. You can also do it the cheapest possible way: Get a model hot-air balloon and one of those small APS or 35mm film cameras (they're lots cheaper than digitals) that takes a cable release and has automatic film advance, and attach a remote control trigger to the cable-release socket. Suspend the camera from under the balloon, send it up in the air tethered to a string, and use the remote to fire away when you think that the camera's getting the picture you want. Count on wasting lots of film. Then have the film processed and run it though your slide scanner (the higher the resolution, the better, because you'll have to do some cropping to get the composition you want).

You can get much more in-depth information on aerial kite photography from `www.kiteaerialphotography.net`. Also, if you're interested in rigging remote controlled units for a full range of model vehicles, you'll find a wealth of information by looking up R/C (stands for *Remote Controlled*) model sites on the Web. Quite a few have information on one technique or another for using a camera, digital camera, or video camera on a model. You'll also benefit from spending lots of time in model shops.

One final word of warning: Plan to spend lots of money and training time in learning to fly and control your models. A remote-controlled helicopter to which you'd entrust a digital camera will cost at least $1,000 and you'll probably crash it several times before you learn to fly it well enough to entrust your camera to it.

✦ Wratten #89B

✦ Wratten #88A

✦ Wratten #87

✦ Wratten #87C

Harrison and Harrison (1835 Thunderbolt Drive Unit E, Porterville, CA 93257-9300 phone 559-782-0121) also make a low-cost 88A filter. Personally, I like to buy the gelatin versions of these filters. They are very inexpensive (usually under $10 for a large sheet) and can be cut to fit over any size lens—even big supplementary

fish-eye lenses. You can either place them into a slide-in filter holder or simply tape them into place. If you tape them, be sure that the tape doesn't overlap into the picture area. Of course, you can just hold them over the lens while you take the picture.

Also, each near infrared filter is not only more or less dense (requiring more or less exposure) but affects the interpretation of different colors and surfaces. So it's not a bad idea to have a whole collection of them so you can experiment. That's another advantage of digital photography: Experimentation is free (except for the cost of the filters, of course).

To take the infrared picture, put your camera on a rock-steady tripod. Use manual focus and exposure. Focus at the distance of the closest object that you want to keep in razor-sharp focus. If you're using a wide-angle lens, you'll have much greater over-all depth-of-field, which is the distance between the nearest and farthest objects that are in reasonably sharp focus. Frame and compose your picture *before* you place the filter over your lens because at that point, you won't be able to see anything.

You will have to use exposures that are quite long compared to those you would use on a camera without the filter. Light meters don't usually help much but — thank heavens — you're shooting digitally and can see the results immediately. Because most digital cameras sport real focal lengths that are a fraction of those of a 35mm camera, you have the advantage of extreme depth-of-field. This means that you can shoot with your lens wide open. In bright daylight (depending on clouds and time-of-day), your exposure should be between $\frac{1}{4}$th and $\frac{1}{16}$th of a second. You sometimes get surprisingly different results from different exposures with different subject matter, so it's a good idea to experiment. Some cameras have a bracketing mode that automatically exposes a number of frames by a pre-set variation in exposure values. If your camera has such a feature, I definitely recommend using it.

> **Tip**   If you want to get really wild, shoot color versions of the exact same photos by simply removing the filter and switching to automatic mode. You can then experiment with stacking your color and infrared photos in your image editor's layers and using the layer blend modes and opacity controls to create effects rarely seen before by the human eye.

Summary

This chapter discussed software that performs peripheral jobs to enhance working with digital images; this software isn't specifically or primarily image-processing software. I also outlined some criteria for choosing the accessory imaging software, the main purposes of the software, and the names and principle features of the primary players.

✦   ✦   ✦

Producing the Best Output

Part VI provides easily understood coverage of how to ensure that the output image looks like what you saw on your monitor when you were editing it. The discussion begins with figuring out what desktop printer is best suited to your photographic needs. It then takes you through the processes of calibration and profiling that will make your output predictable. Finally, I explain how to utilize specialty output options, including having your prints made over the Internet and using wide-format printers for purposes such as fine-art exhibitions.

✦   ✦   ✦   ✦

Choosing and Using a Desktop Printer

As you already know, a digital image is an incredibly versatile resource. You can ship a digital image to someone in e-mail, plaster it on your Web page, work magic on it with your Photoshop filters, turn it into a piece of psychedelic art, or create a screen saver for your computer's idle moments. Somehow, all these hi-tech possibilities may make you sometimes feel . . . well . . . *bored* with plain old prints on plain old paper.

However, I think most of us agree that paper is still the preferred media for displaying photographs — and probably always will be. Therefore, it's imperative that you choose the right type of printer for your system, and this choice involves selecting the right output quality at the fastest speed and the lowest price.

This chapter guides you through the process of selecting, installing, using, and maintaining a printer under both Windows XP and Mac OS X.

What Type of Printer is Right for You?

Many photographers that I talk to automatically assume that a high-end expensive inkjet is the only "correct choice" for a photo-quality printer. I'm always quick to point out that the "correct choice" isn't necessarily the same for every photographer. It's true that inkjets have been the de facto standard in high-resolution color printing for many years now, and you may very well have an inkjet in your future. However, some printing methods offer higher quality, and some are even less expensive in the long run.

In this section, I discuss the pros and cons of three different color-printing technologies, and you can decide for yourself which one is the "correct choice!"

Tip   If at all possible, test each printer that you are considering purchasing before you make your decision. To produce comparison pages, record several of your high-resolution images on a CD-ROM and bring it with you to the stores, along with several sheets of glossy photo paper. (Naturally, this may not be possible if you're buying a high-end model that's not stocked locally; in cases like this, you'll have to rely on product reviews from magazines and compare specifications.)

Inkjet printers

The inkjet printer is the affordable answer for most homes and small offices, and most computer owners know its attractions:

✦ **Laser-quality black text:** When printing on standard bond paper, the black text that a good quality inkjet printer produces is indistinguishable from the same output from a laser printer.

✦ **Excellent color image reproduction:** Today's typical resolutions for consumer inkjets — 2400 x 1200 dpi and 2880 x 720 dpi, for example — provide the level of detail necessary to print everything from display pieces to smaller prints, including contact sheets and proof pages.

✦ **Inexpensive to buy:** A high-end inkjet printer that offers a USB connection should only set you back $300 (or less); those that can accept digicam memory cards and print photographs directly, such as the HP PhotoSmart series, range up to $500. For example, the HP PhotoSmart 1315 inkjet, which delivers 2400 x 1200 dpi on photo paper, retails for about $400. Like the other PhotoSmart printers from HP, you don't even need to connect it to a computer to print from your CompactFlash and SmartMedia cards.

✦ **Versatile paper handling:** Inkjets can use a very wide range of paper weight, thickness, and material, which provides the photographer more creative choices when printing images for display.

✦ **Replacing cartridges also replaces the print head:** Unlike dye-sublimation printers, most inkjet printers locate the actual print head and nozzles on the ink cartridge itself. Therefore, when you change an ink cartridge, you also get a new print head in the bargain (which helps to ensure that the quality of your photographs remains constant over the life of the printer).

✦ **Easy maintenance:** An inkjet requires less maintenance than dye-sublimation and color laser printers. Additionally, it's generally easier to change ink cartridges and clean the interior of the printer than the other two types of printers.

✦ **Larger printing surfaces:** Wide-body and large-format inkjet printers can produce pages in much larger dimensions than other printing methods — for example, the Epson Stylus Color 3000 can produce full-bleed, 13 x 19-inch pages at 1440 x 720 dpi.

An inkjet printer produces an image by "firing" tiny droplets of ink onto the page—usually by using two cartridges (one for pure black and one for color, although many inkjet printers are now using separate cartridges for each ink color), as shown in Figure 17-1.
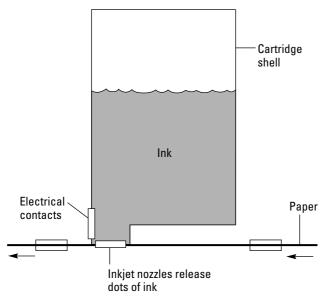
Figure 17-1: An inkjet printer dispenses drops of ink through tiny nozzles onto the paper.

Now for the bad news on inkjet printers:

✦ **Most can't reproduce continuous tones.** No matter how high the resolution or how small and diffuse the droplets, an inkjet still creates images by putting dots on paper. Therefore, low- to mid-range inkjet printers can't produce the continuous tone images that a dye-sublimation printer (or the most expensive inkjet printers, as discussed in Chapter 7) can deliver.

✦ **Banding on large areas of darker color.** Because the inkjet printer head can only cover a small distance of the page at one time and because it doesn't diffuse colors like a dye-sublimation printer, inkjets can produce a horizontal "striped" effect called *banding* on large areas of darker colors such as blue, purple, and black. Today's inkjets reduce banding to a minimum, but as the printer head within the inkjet cartridge ages, banding can become more pronounced.

✦ **Inks can smudge.** You should carefully handle the photographs produced by an inkjet, because the oil from your hands or a drop of moisture can cause the printed surface of the page to smear and smudge. Some manufacturers advertise "waterproof" and "water-resistant" inks, but I recommend that you take such promises with a grain of salt.

When considering an inkjet printer for digital photographs, look for these features:

✦ **High-capacity ink cartridges.** Larger ink cartridges are more economical over time, because they require fewer replacements. Additionally, many photo-quality inkjet printers now offer either three or five separate color cartridges (or ink tanks). This feature allows you to change the individual colors that you use the most and save money by replacing a single ink cartridge rather than a whole cartridge that's simply low on one color.

✦ **Flat-out speed.** Like any good sports car, the price of a printer — sometimes even the price between similar models from the same manufacturer — is often related directly to top speed. For example, most of us won't spend $50,000 on a car (which may travel over 80 mph once a year) when we can buy a perfectly good car for $15,000 that won't reach the same speed. Only you can decide whether those two or three extra pages per minute are worth the extra expense.

Tip

You may notice that some printer manufacturers have the (somewhat sneaky) habit of advertising the number of pages a printer can produce in color in *draft* mode. In photography, the quality of the image is what's important, so draft mode speeds are irrelevant. (As a matter of fact, I don't think I've ever actually *used* my expensive inkjet in draft mode.) Therefore, consider only best-quality printing speeds when comparing the output of different printer models.

✦ **Variable-size dot patterns.** A number of high-end inkjets can vary the size and dispersion of the ink droplets that they apply to the paper, resulting in near-continuous tones that are hard to distinguish from a dye-sublimation printer. (This topic is discussed further in Chapter 7.)

✦ **The highest resolution possible.** Although a higher resolution isn't always a guarantee of a better quality image — printer manufacturers like Hewlett Packard, for example, stress raw dpi resolution less than the size of the droplets and the number of colors per pixel — the general rule still holds that "higher is better."

✦ **Direct printing from memory cards.** This can save you a step — in fact, you produce an image without even connecting your printer to a computer! (Naturally, doing this won't allow you to edit the image first, but I've found that candid shots I take at a party or a game are rarely candidates for Photoshop, anyway.)

✦ **Calibration and cartridge ink level checking through software.** The more fine-tuning and calibration your printer can perform through software, the better. Later in this chapter, I show you some of the features of the HP Toolbox program that ships with HP PhotoSmart printers.

✦ **Straight-through paper path.** If you use a wide range of specialized papers in your inkjet printer, I recommend that you purchase a printer that uses a straight-through feed. These printers can accept thicker paper, as shown in Figure 17-2, so you can avoid the "curled" output that's produced by printers that use an under-and-over paper path.
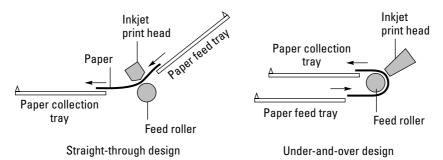
Figure 17-2: Comparison of straight-through and under-and-over printer designs

Dye-sublimation printers

If accurate reproduction of fine detail, continuous tone, and subtle shading in the finished output are the most important features that you're looking for in a printer, then a dye-sublimation printer is definitely your best bet. In fact, before the arrival of truly high-resolution inkjets, a dye-sublimation printer was practically the only way to get a near-perfect, 16-million color, photo-quality print from a desktop-size unit. Even today, the photo quality of a dye-sublimation image is generally considered better than even the most expensive inkjets.

Dye-sublimation printers are often called *thermal* printers as well, as shown in Figure 17-3. This technology uses heat to melt (or vaporize) and transfer solid dye from a ribbon to the paper by using either a roller mechanism or a series of pins (much like the "antique" impact technology used in dot-matrix printers during the early years of personal computers). The liquid or gaseous dye is formulated to bond and spread slightly on the paper.
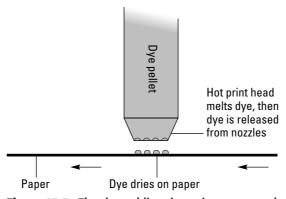
Figure 17-3: The dye-sublimation printer can produce continuous-tone images.

So what's the downside to dye-sublimation technology? Here's the short list:

✦ **Cost:** The printer, the dye, and the paper all cost more than a photo-quality inkjet . . . a *lot* more, anywhere from 5 to 10 times as much. Dye-sublimation printers aren't designed to work with plain paper, and the same characteristics that make them a superb choice for producing photographs make them a poor choice for printing simple black text.

✦ **Print size:** Dye-sublimation printers produce much smaller output. Virtually all of these exotic beasts are limited to turning out page-sized or smaller prints.

✦ **Speed:** When purchasing a dye-sublimation printer, look for one that can print two pages per minute, and remember that these are pretty small pages. Any inkjet or color laser can turn out color images in half or a quarter of that time.

Color laser printers

Just a few short years ago, color laser technology was so expensive that I would have simply glossed over this section. Today, though, a mere $900 or so can bring you the luxury of printing your digital photographs on one of these units.

To be honest, a color laser won't beat the appearance of a print made with a high-end inkjet printer or a dye-sublimation printer; however, that same machine is far more versatile if you're looking for a single machine that can "do it all." Laser printers produce the best grayscale images and black and white text, as well as common office output, such as transparencies and labels. You can also produce works of art by using special heat-transfer papers (such as gold foil). For informal documents and less demanding color work, a color laser printer can do the job just fine.

A color laser brings these advantages to the table:

✦ **Built-in PostScript interpreter.** A color laser printer is more likely to have PostScript support built-in than an inkjet or dye-sublimation printer (both of which may offer such support as an option, but are more likely to force you into using a software interpreter).

Cross-Reference You can read more about PostScript interpreters in Chapter 7.

✦ **Longer-lasting color.** Because a laser actually fuses toner to the surface of the paper, you don't need special glossy photo paper to achieve longer-lasting color from a color laser printer (although you can purchase special papers that further enhance the archival properties of your prints).

✦ **Built-in network support.** Virtually all color laser printers have built-in Ethernet network support, so you don't need to buy any optional hardware or use a separate computer to act as a print server. This can be a real advantage for a home office.

✦ **Economical over time.** When considering cost per page, a color laser printer is actually less expensive to operate over the long run than either dye-sublimation or inkjet printers. In general, laser printers are more reliable and can handle a heavier workload than inkjet or dye-sublimation printers.

Printing Photographs with a Multifunction Printer

Most serious digital photographers have turned their back on *multifunction* (or "all-in-one") devices, which offer both printing and scanning in a single box. Regarding the scanning part of the equation, I have to agree. As you can imagine, scanning a photograph with a sheet-fed multifunction device results in a significantly lower-quality image file, because the original is moving past the scanning head (rather than remaining motionless while the scanning head moves, as in a flatbed scanner). Also, many multifunction units can't handle thicker card stock, so you risk the possibility of both a damaged print and an inaccurate scan.

On the other hand, it's possible to produce a photo-quality print from one of these units because most use the same inkjet "engine" that's also used in the manufacturing company's printers. If you have an all-in-one in your office, for example, it can do double-duty printing contact sheets if you suddenly run out of ink for your high-end primary inkjet printer. When shopping for a multifunction device, consider the same pros and cons previously covered in this chapter concerning inkjet printers (and keep a stack of photo paper handy, ready to swap for that recycled plain paper you'll usually use in your new all-in-one).

Choosing the Right Ink and Paper

Speaking of paper, it would be a mistake to focus only on the hardware — after all, even the best dye-sublimation printers turn out really atrocious-looking prints if you use the wrong paper. Many inkjets are still using dye-based inks that fade quickly, so your photograph will look like a pair of stonewashed blue jeans within a couple of years due to UV light and humidity. On the other hand, with the right ink and archival paper, your inkjet printer can turn out a photo-quality print of a digital photograph that can last as long as any film print.

In this section, I discuss each of the most common types of paper available for today's computer printers. For those who are fond of technical terms, use the word *substrate,* which refers to any surface used for printing (including exotics such as fabric). Inkjet owners can find information in this section to use while shopping for longer lasting ink cartridges.

Plain bond

The all-purpose workhorse of the home and office, plain bond (often described as "suitable for inkjet, fax and laser printing") is well suited for most printing applications, and it's the most inexpensive paper discussed in this chapter. However, plain bond should actually be your last choice for printing photographs for the following reasons:

✦ **Ink soaks in.** If you're using an inkjet, you'll find that the surface is too porous to provide the proper diffusion, so you'll note the dot pattern in everything you produce. Fine details are lost, and the colors never match the brightness delivered by photo paper or fine art paper.

✦ **It's not completely opaque.** The printed image is visible from the reverse side of the page (this by itself is usually enough to alienate any photographer).

✦ **It's not stiff enough.** Bond paper is far too thin, resulting in "waves" across the printed page. It is also easily creased with even the most careful handling, and the edges of the printed image are likely to curl or nick when cut.

✦ **Irregular surface.** You aren't guaranteed that the bond paper will have a uniform surface — many types are made from recycled materials, which results in specks and pits in the substrate. This doesn't matter when printing a simple memo, but such minute imperfections will ruin a digital photograph.

Caution   A special note to the owners of dye-sublimation printers: Never use plain bond paper because a dye-sublimation printer can't produce a proper image without the special paper recommended by the manufacturer.

"So is there *any* use for plain bond?" Sure — it's suitable for photos that your kids may need for school projects and reports, and I use bond for printing quick reference thumbnail sheets using Photoshop, Paint Shop Pro, and Extensis Portfolio. For anything more important, however, keep that box of plain bond next to your fax machine and away from your printer.

Semi-gloss and high-gloss photo paper

These papers are the most common choices for producing simple prints. As you may expect, semi-gloss papers have a less reflective surface, but both papers solve the problems related to plain bond. This is the standard paper type for use in dye-sublimation printers.

Gloss paper has a "sealed" substrate that allows ink from an inkjet or dye-sublimation printer to diffuse and spread, thus producing far better results in continuous tones and small details. Gloss photo paper is stiff enough for handling, holds its edge when cut, and has a uniform surface. Most of these papers carry a backing watermark, so they have an authentic film print "look and feel." These papers typically have a longevity period of several years.

Gloss paper is produced in a large range of sizes — everything from single prints (usually for use with dye-sublimation printers that deliver single prints) to large-format 11 x 17-inch pages, as well as special formats for greeting cards and pre-printed postcards. You can easily find gloss photo paper at virtually any computer or discount store.

Fine-art paper

Matte and semi-matte *fine-art* paper is your best selection for archival and display printing, because it reflects less glare than semi-gloss and high-gloss photo paper. For the best longevity, steer towards acid-free, polymer-coated papers that are resistant to humidity, ozone, and ultraviolet light. When used with pigment-based archival ink and an acid-free separating matte, these papers have a display life that's as long as any traditional film print. For example, Epson makes a number of papers that are rated by Wilhelm Imaging Research (`www.wilhelmresearch.com`) at over 25 years (under archival glass or Plexiglas), which is several years longer than color film prints made with Kodak Ektacolor paper.

Most fine-art papers are still thin enough to move properly through the manual feed on a color laser printer, and they can often be used in dye-sublimation printers as well. These papers are suitable for the lion's share of your presentation and display work, and the cost for fine-art media falls between gloss photo paper and the Rolls-Royce category of media, the exotic papers.

Exotic papers

Forgive me for "lumping" these media under one heading, but they really are rather exotic. You won't use them often, and most dye-sublimation and color laser printers can't handle them, so they're limited to inkjet use. (If your printer manufacturer lists the maximum thickness and weight for media, you can usually verify that your inkjet printer can handle a specific paper before you buy it.) Naturally, exotic papers are also the most expensive, and are typically available only at art supply houses or online printer supply stores. The list of exotic papers includes the following:

✦ Rag

✦ Canvas

✦ Linen

✦ Watercolor

✦ Parchment

Tip As you may expect, these thicker and stiffer papers are more prone to paper jams, so make sure that you adjust your paper tray guides to keep the sheets oriented as straight as possible and reduce side-to-side movement as much as possible.

The results from these papers can be spectacular, but it's a good idea to test the output on a single sheet first before selecting your favorite and laying in a stock.

All inks are not created equal

When selecting inks for archival or display printing, you'll find that pigment-based inks are the longest-lasting — most are rated to last at least 100 years without fading. However, dye-based inks (which are the standard in the inkjet world) provide brighter and more even saturated colors, and are much less expensive to produce. Therefore, a number of manufacturers have been working on extending the life of dye-based inks, and in some cases, have reached a fade-free rating of 25 to 30 years.

Caution   Never leave your prints exposed to bright sunlight or open air for more than a minute or two. The best storage options are an aluminum frame behind UV-coated archival glass or in the acid-free pages of a photo print album.

In my opinion, refilling inkjet cartridges is a mistake (I discuss this further later in the chapter), and using pigment-based ink in a cartridge designed for dye-based ink is inviting disaster. Therefore, if you're interested in the longest lifespan for your prints, you should buy cartridges from the printer manufacturer or use third-party cartridges that are specifically designed for your unit.

Installing Your Printer

Suppose that you just bought the latest in state-of-the-art printing technology, and it is sitting in the box waiting to be installed. You'd be surprised just how many professional photographers start to get nervous at this point; as a friend of mine says, "I know the camera inside and out, but either the computer works or it doesn't!" Even people who have plenty of experience in digital photography are somewhat taken aback by the addition of new hardware and the inner workings of their computer's operating system.

Luckily, the art of preparing a new printer under Windows XP and Mac OS X has become much easier to master with the arrival of USB hardware — much of what had to be tweaked in the days of yore is now handled automatically for you. In this section, I cover both the installation of a USB and — in the event you're stuck with an "antique" — a parallel port printer.

Unpacking your printer — the right way

Most computer owners don't think twice about unpacking hardware, but you may encounter hazards while setting up your new printer. (Just ask anyone who's ever sold or repaired computer equipment.) You may be anxious to try out that expensive photo-quality inkjet, but hurrying through the unpacking process can result in lost parts or damage to your new hardware. If you exercise common sense and don't rush, you're much less likely to make a costly mistake.

Before you even cut into that tape, make a rule to always look for external damage to the box! (This is just as important when unpacking monitors and computer cases.) In fact, if you're going to buy your printer from a local store and the box is badly punctured or torn, ask for another unit. If you bought your printer online and the box is in bad condition when you receive it, carefully check for damage to the contents as soon as you unpack it, and return the unit if you find something wrong.

Keep these general rules in mind while unpacking your printer:

✦ **Follow the manufacturer's instructions.** Check the outside of the box for unpacking instructions. Also, most manufacturers put the printer manual, which may include important information about what's included, on top of the printer. Open the manual and read before you proceed any further.

✦ **Beware of "hidden" parts.** Unfortunately, small parts can be lost because they're completely buried in Styrofoam packing material, or they're taped to the underside of a cardboard insert. The most common items treated this way include ink cartridges, snap-on paper guides, cables, and the software and driver CD-ROM. These parts are probably mentioned in the first few pages of your printer's manual, but check any packing material or inserts — just in case — before you place them back in the empty box.

Tip Don't forget to check the manufacturer's Web site for the latest drivers. New drivers are produced to fix printing bugs, enable new features, and improve compatibility with your operating system. These drivers may be released while your printer is sitting in its box on the shelf.

✦ **Pull the printer from the box.** Never open one end of a box and simply dump the contents on the floor. Instead, put the box flat on the floor and gently pull the entire contents out from one end of the box. This prevents an accidental slide and possible damage to your new printer.

✦ **Store the box throughout the warranty period.** Most computer hardware carries at least a one-year warranty, and the box is worth its weight in gold if you have to return it. Also, if the printer fails within a short time, both online and local stores require the box to accept a return.

Tip Are you an active hardware seller on eBay, or do you constantly sell your older used hardware to your friends and family? If so, it's a very good idea to store your printer's empty box for as long as possible because that printer will likely be worth more if you can sell it in the original box.

Adding a parallel port printer under Windows XP

Although most new printers on the market these days use a USB connection, the faithful old PC parallel port is still an option. Additionally, a parallel port is the standard connection for printers made prior to two or three years ago, so it may be useful to know the procedure for adding a parallel port printer under Windows XP.

You must first locate the parallel port on the back of your PC — it's a 25-pin female port (usually accompanied by a printer icon or the rather cryptic label "LPT1:"). If you run across a 25-pin male port, you've found an older serial port for modems and serial devices. These connectors won't work with a parallel port printer cable, shown in Figure 17-4, so you should only find one connector on the back of your PC that will work.

PC connector   Printer connector
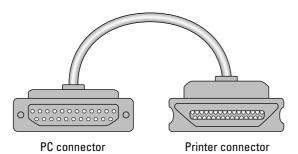
Figure 17-4: A standard PC parallel port printer cable

> **Tip**   I always recommend that PC owners mark their cables with a fine point perma-
> nent marker. This helps to prevent confusion when you have to unplug that nest of
> cables to add new hardware or move your computer from one place to another.

In order for Windows XP to recognize your printer, it must be on during the Windows boot process, so it's important that your new printer be ready before you boot the computer. Connect the AC cord from your printer to the wall socket or surge suppressor and load the feed tray with paper. After you have installed your printer, check to make sure it's turned on before you turn your computer on — one way to do this is to plug both your printer and your PC into the same surge suppressor, and then turn everything on with the switch on the outlet.

After you've located the port and prepared your printer, follow these steps:

1. **If your printer came with an installation disc, load it now.**

    Some manufacturers, such as Hewlett Packard, lead you step-by-step through the software installation process. If that's the case, you can ignore the rest of this list and follow their procedure.

2. **Shut down Windows XP.**

    This typically shuts down your PC automatically, but if necessary, switch your PC off as well.

3. **Attach the printer cable to your printer and to the parallel printer port on the back of your PC.**

4. **Turn on your PC.**

5. **If your printer supports Plug and Play functionality, Windows XP recognizes that you've added a printer and prompts you for the driver CD-ROM.**

   After you've located the driver, Windows XP automatically configures your printer.

   If you're installing an older printer that doesn't support Plug and Play, click the Start button, click Printers and Faxes, and then click the Add Printer icon to run the Add Printer Wizard, as shown in Figure 17-5. Follow the wizard's instructions to manually install your printer's driver and configure it within Windows XP.

Figure 17-5: Adding a printer manually using the Windows XP Add Printer Wizard

6. **Click the Start button and click Printers and Faxes to display the printers recognized by your computer.**

   Check to make sure that the icon for your new printer appears in your Printers folder.

Adding a USB printer under Windows XP and Mac OS X

USB connections are great — no need to turn off your computer, and the USB connector only plugs in one way (the right way)! Connect the AC cord from your printer to the wall socket or surge suppressor, load the feed tray with paper, turn your printer on, and then follow these steps:

1. **Connect the USB cable to your printer, and plug the other connector into a USB port on your computer.**

2. **Your computer should automatically recognize that you've added a USB device.**

If your computer's operating system already has a driver for the printer that you're installing, you're done. However, if your printer requires a new driver, you'll be prompted to load the manufacturer's CD-ROM that came with your printer. (Many manufacturers provide an Installer program for Macintosh owners.)

3. To check for the new printer under Windows XP, click the Start button and click Printers and Faxes.

This action displays the printers that are recognized by your computer, as shown in Figure 17-6.

Under Mac OS X, click the Print Center icon in the Dock.

You can set the new printer as your default by selecting it, clicking the Printers menu, and then choosing the Make Default menu item.
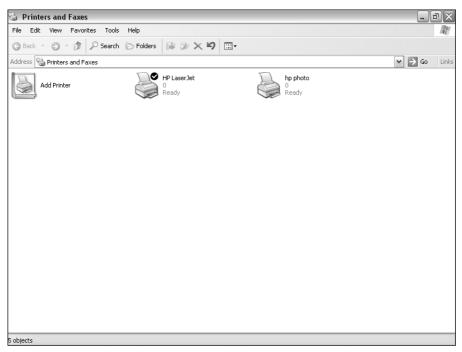
Figure 17-6: Displaying the printers available on my system under Windows XP

Tip   Remember, you can also remove your USB printer from your system by disconnecting the cable, without turning off your computer, and you can plug your printer back in at any time.

Improving Printer Performance

When most computer owners think of printer performance, they think of raw speed — how many pages per minute that the printer can deliver. If you have a little more technical knowledge of how a printer works and you're thinking of a color laser printer, you may also consider the amount of on-board memory. The more RAM a printer has, the faster the printer can process the language that makes up the page.

However, you can also take a number of other steps to improve printing performance that don't involve your printer at all, including the following:

✦ **Tweak your operating system and drivers.** Naturally, printer drivers vary by manufacturer. However, you can adjust some settings common on most printers under Windows XP to improve performance, like using print spooling.

✦ **Optimize your system hardware.** This includes defragmenting your hard drive and adding extra memory to your computer.

✦ **Install additional hardware specific to printing.** This includes hardware printer buffers and standalone print servers.

In this section, I tackle each of these performance-enhancing tricks in turn.

Enabling print spooling in Windows XP

Most printers simply don't have the on-board memory to accept an entire high-resolution image at once — you don't have to own a large-format inkjet printer to find this out quickly! Luckily, since the early days, Microsoft has included a feature called *print spooling* in Windows that can help optimize the printing process. A print spooler takes care of two tasks in Windows XP:

✦ **Temporary storage for larger print jobs.** A single 5 megapixel image can actually "overflow" the on-board memory in a typical inkjet printer. To prevent losing any of that image, Windows XP automatically uses space on your hard drive as "virtual memory" and stores the rest of the file temporarily until your printer can accept it.

✦ **Background printing.** In the hoary days of DOS and Windows 3.0, your PC sat still until the entire image had been sent to the printer; a print spooler allows Windows XP to return control to your applications (so you can keep typing in Word or working in Photoshop while your printer is busy). Mac OS has had this feature since version 8 as well.

Not every printer manufacturer enables print spooling automatically when you install your printer, but you can turn the spooler on at any time. Follow these steps in Windows XP:

1. **Click the Start button and click Printers and Faxes.**

   This action displays the printers that you have installed on your system.

2. **Right-click on the printer you're using to produce your images and choose Properties from the pop-up menu.**

   The printer's Properties dialog box appears. The location of the print spooler controls varies according to the manufacturer's printer driver, but with a little hunting, you should find settings similar to the ones shown in Figure 17-7, which are the spooler settings for an HP PhotoSmart P1000.
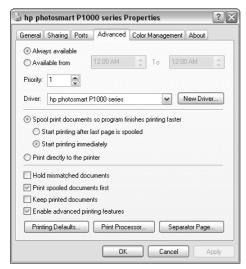
Figure 17-7: Enabling printer spooling under Windows XP

3. **Enable the spooling feature, and click OK to save your changes within the Properties dialog box.**

Defragmenting your hard drive

If you're not aware of the benefits of *defragmenting,* it's high time I explained this "power user" optimizing trick. In fact, defragmenting your hard drive on a regular basis not only improves printing performance under Windows XP and Mac OS, it also optimizes the overall efficiency of your entire system and all the applications that you run (including your image editor).

Before I go further, a little explanation is in order. As you delete files from your hard drive to free up space, you open "holes" between the remaining files; these holes then become the storage space where new files are saved. Unfortunately, your hard drive almost never has a contiguous open area large enough to fit a file that's several megabytes long (or, in the case of a digital photograph, several dozen megabytes). Therefore, Windows must store the file in several smaller segments, usually spread

out across the surface of your hard drive, as shown in Figure 17-8. The larger the file, the more segments Windows must create. When the time comes to read the contents of the file, Windows automatically "reassembles" the segments back into the original file. This behind-the-scenes work is all automatic, and mere humans like you and I aren't even aware that the file is no longer stored in one piece.
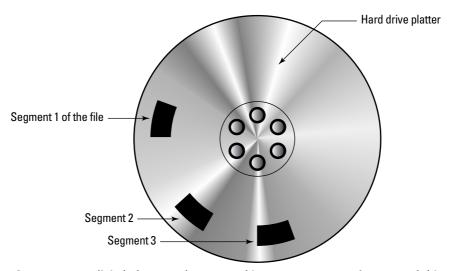
Figure 17-8: A digital photograph separated into segments on a fragmented drive

The problem comes in when most of the files on your hard drive are stored in segments — something that normally happens after a number of weeks of normal use, and much sooner if you've been using your PC heavily. At this point, your hard drive has become *fragmented,* and Windows takes significantly longer to get work done because most of the files that you open have to be reassembled before you can use them. In fact, fragmentation slows down Windows XP as a whole, including the printing process. Remember the Windows XP print spooling feature I mentioned in the previous section? You can see how a badly fragmented hard drive slows down the "virtual memory" function that enables you to print very large images by using disk space as temporary RAM.

Luckily, the good folks at Microsoft have provided a solution. They've included a program called Disk Defragmenter in both the Home and Professional versions of Windows XP. I recommend that you run this program at least once a week; it reads in the fragmented files on your hard drive and saves them back to the drive as whole, contiguous files, as shown in Figure 17-9. In fact, Disk Defragmenter also optimizes the placement of the files that you use the most as it's working, so the applications and files that you use most often load faster.

Figure 17-10 illustrates Disk Defragmenter at work, analyzing the number and position of the fragmented files on my drive. To run Disk Defragmenter, select Start ⇨ All Programs ⇨ Accessories ⇨ System Tools ⇨ Disk Defragmenter.
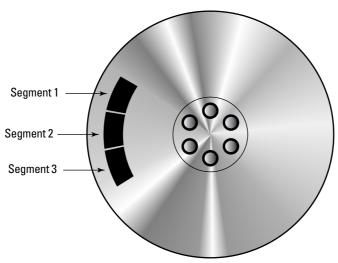
Figure 17-9: After you've run Disk Defragmenter, your image is one efficient, contiguous file.
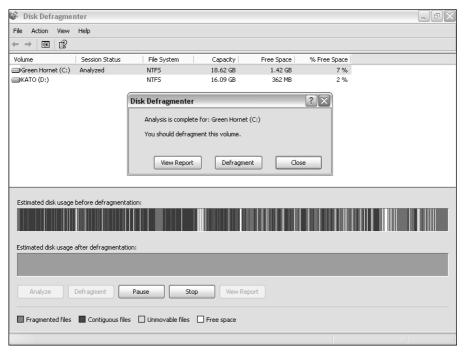
Figure 17-10: Windows XP includes Disk Defragmenter — one of my favorite utilities

The importance of system RAM

In this section, I want to stress a favorite maxim of mine (one that I'm constantly repeating to anyone who owns a computer in my general vicinity): *Buy RAM!* Memory is cheap these days, and nothing you can buy for your computer will do more to improve its overall speed and performance — except, of course, for a new processor, but that's a much more expensive upgrade that often means an investment in a new motherboard as well.

As I mentioned previously in the book, expanding your system from 128MB of RAM to 256MB or 512MB is a great help for editing digital photographs. You'll also notice that your print jobs are queued faster, even with multiple applications open. This is because the more physical RAM you pack into your computer, the less Windows must use your hard drive space as "virtual memory" while preparing the print job.

Tip	Some manufacturers allow you to "appropriate" a set amount of system RAM as a *soft* printer buffer as a setting within the printer's Properties panel (as opposed to an actual hardware printer buffer, which I cover in the next section). If you have this option and you have at least 256MB of system RAM, I recommend that you reserve 8 or 16MB of memory. If your printer driver doesn't have a soft printer buffer option, don't stay awake at night worrying about it; Windows XP has an internal buffer that takes care of the job, but you can't dedicate a specific amount of memory to it.

Adding standalone printing hardware

Before I close this section on printer performance, I should mention two pieces of external hardware that can help to improve the efficiency and accessibility of your printer:

Parallel port printer buffer

Since USB printers have become the norm, these external boxes are less popular and a little harder to find. However, they can come in quite handy if you have an older color printer that uses a parallel port connection, which, as mentioned previously, was the standard connection just a couple of years ago. With an external printer buffer, you can produce high-resolution images without degrading the performance of Windows XP and your other applications (no "disk thrashing" or long pauses while image data is poured into a printer that has only 4MB of internal memory). Figure 17-11 illustrates an external printer buffer in action. It's a simple device — basically a box that contains anywhere from 2 to 16MB of RAM that accepts data from your computer and stores it temporarily until your printer can accept it. To locate a printer buffer, visit Pricewatch (`www.pricewatch.com`), or search for used external buffers on eBay.
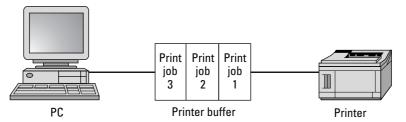
Figure 17-11: A parallel port printer buffer can help optimize printing with older hardware.

Tip   If you've installed all of the optional memory modules that your printer can handle, a print buffer is another method of optimizing the performance of your system.

Printer servers and sharing hardware

If you've bought a color laser or high-end inkjet printer that has built-in network support, you can hook your printer directly to your simple Ethernet home or office network. However, if your parallel port printer doesn't have network support, you can use one of these external boxes to share your printer among multiple computers. A print server requires an Ethernet network, while a printer sharing device like the one shown in Figure 17-12 uses its own cables and needs no existing network. Both of these solutions usually include built-in buffer memory as well, so things run more smoothly while you share your printer.
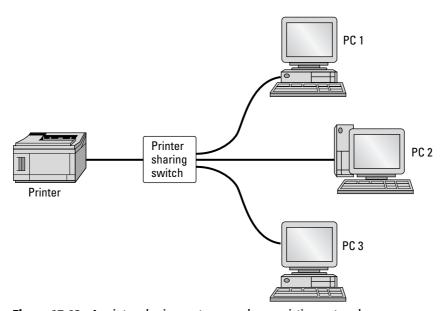
Figure 17-12: A printer sharing system needs no existing network.

Tip

Do you have an older PC just hanging around collecting dust? If so, you can configure that PC to act as a dedicated print server. The computer that you use for this purpose should have a large-capacity hard drive, a fast network interface card, and at least 64MB of RAM. Describing this process is not within the scope of this book, but most books on home and small office networking cover this topic.

Tips for Inkjet Printing

Inkjet printers are the most common choice of digital photographers. Therefore, the following sections review a number of guidelines that inkjet owners should follow to help ensure the best possible printed image.

Avoid refilling cartridges

Inkjet cartridges are expensive — believe me, I know. My inkjets have a ravenous appetite, but I don't use a refill kit to save money, and I don't recommend that you do either if you want the best results from your hardware. You should avoid reusing cartridges for a number of good reasons:

✦ **You're reusing the print head.** As mentioned previously, one of the advantages of using an inkjet is that a replacement cartridge provides you with a brand new print head. When you refill a cartridge, you're reusing inkjet nozzles that weren't designed for such use. Although your prints may look fine right after the cartridge has been refilled, you risk a significant degradation in image quality within a few weeks or a month. (The time you have before things start to go downhill varies by manufacturer and cartridge design.)

✦ **The ink is generally lower quality.** The ink used in a refill kit is rarely as high quality as the original ink from the manufacturer, and you have to recalibrate your system if the ink varies even the slightest in color from the manufacturer's ink.

✦ **You may void your warranty.** Check your printer's warranty to make sure that the manufacturer allows you to refill cartridges.

✦ **It's usually messy work.** Depending on the design of the cartridge and the manufacturer of the refill kit, you may find yourself creating quite a mess while you're adding ink. If you do decide to try refilling, make sure that you've spread newspaper or some other covering over your table before you begin.

Check your paper feed often

It's always a good idea to check your printer's paper feed before each print job; it only takes a second. Here's what to look for:

✦ **Adjust the paper guides.** Make sure that the paper guides are feeding the sheets straight into the printer. It's easy for these guides to be jostled out of position, which can cause the printer to feed pages out of the proper orientation.

✦ **Disable alternate feed features.** Ensure that the right paper is heading to the printer. For example, one of my inkjet printers has a dual-tray feature controlled from a switch at the front. To avoid printing on the wrong type of paper, I make it a point to check this switch each time I use the printer. This also applies to manual envelope feeds.

✦ **Make sure that the paper is fed in the proper direction.** Even the cheapest bond paper usually has an edge that the manufacturer recommends you load first.

✦ **Check your media for tears or creases.** Naturally, you'll have less of a problem with damaged media if you keep your kids away from your printer, but take a moment when adding paper to check the condition of your media.

Load multiple sheets of the same type of media

Here's a tip that will help to you avoid paper jams and misfed pages, especially with older printers: Never print with a single sheet of paper in your printer's paper tray. As your printer gets older, the rubber and plastic drive rollers that are used to "grab" sheets shrink somewhat due to their age, and it becomes harder over time for your printer to pick up a single sheet.

If you're using the paper tray instead of a manual feed slot, load at least five sheets of paper to help elevate the sheets so that the paper is easier to feed. On the other hand, never load more than the manufacturer's suggested maximum number of sheets, which can also cause misfeeds.

Another source of paper jams is a mix of different types of paper — with different weights and thicknesses — in your printer's paper tray. Always use one type of media at a time.

Specify the paper type

Your inkjet printer driver should allow you to select the paper type that you're using. In the Print dialog box, click the Properties button next to the printer name to display the paper type field.

Although these are usually only general categories, such as "glossy photo paper" or "plain paper," you'll still get significantly better results if you choose the proper type instead of leaving the field set to the default. Figure 17-13 illustrates the paper type settings for an HP PhotoSmart printer.
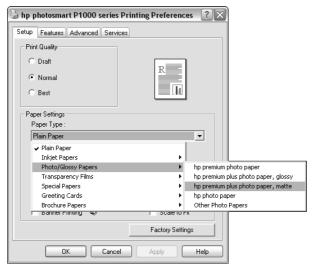
Figure 17-13: Selecting the right paper type can improve the appearance of your photograph.

> **Note**   Some printers can now automatically sense the paper type and choose the correct setting for you.

Proper Printer Care and Feeding

Proper printer maintenance is as important to your final output as the type of ink and media that you're using. Unfortunately, many printer owners simply ignore printer upkeep and only change cartridges when necessary (and then wonder later why their printers are suffering from paper jams and deteriorating quality). If you've spent several hundred dollars on a piece of hardware, it only makes sense to spend a few minutes every week to maintain it. In this section, I discuss the steps you should take to make sure that your printer continues to perform at its best.

Checking cartridges

Although running out of ink or toner while printing isn't quite as bad as running out of gas while driving—you won't end up stranded and walking miles to the next town—it's still a royal hassle, especially when you're running out of time with a deadline looming. It's always a good idea to buy a spare cartridge or two, but you don't want them sitting on a shelf for too long because the ink "settles" and degrades over time.

Luckily, most of today's photo-quality inkjet and color laser printers allow you to check the levels of ink or toner remaining, instead of the time-honored method of shaking a cartridge (which, by the way, can result in clogged and misfiring nozzles in an inkjet). Printers from Hewlett Packard and Epson can actually display the approximate level within Windows and Mac OS. For example, Figure 17-14 illustrates the ink level display for an HP PhotoSmart P1000 photo-quality printer, which looks like the owner just bought a new set of cartridges.
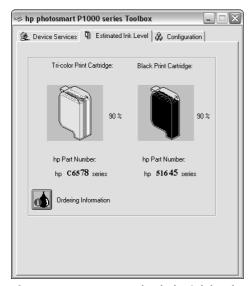
Figure 17-14: You can check the ink levels in this HP printer from the comfort of your keyboard.

Tackling dust inside

Most of us periodically take a moment or two to wipe down the outside of our computers and printers. As long as you use a static-free soft cloth and make certain that you've cleared any dust from your printer's fan or ventilation grille, it's easy to keep the external case of your printer clean.

However, your printer has a number of openings where dust and dirt can enter — your computer's fan may pull dust inside the case as it circulates air, but your printer is actually open to the outside world. Therefore, it's just as important to take care of surface cleaning on the inside as it is on the outside, and the process is somewhat different for inkjet and laser printers.

Cleaning inkjet printers

Make sure that you check the printer's manual first for any procedures or warnings specific to your particular model, but this general cleaning procedure should work for just about any inkjet printer:

1. **Turn off and unplug all cords from your printer.**

2. **Open your printer's cover and remove the ink cartridges.**

3. **Tilt the entire unit to one side.**

   This step is shown in Figure 17-15.

Compressed air

Figure 17-15: The proper way to blast your printer clean with compressed air

Printer on its side

4. **Use a can of compressed air to blast dust from the nooks and crannies inside your printer.**

   It's no wonder that compressed air is such a staple with computer owners all over the world — you can't damage anything, and it's powerful enough to clean everything.

5. **Use a cotton swab dipped in alcohol to wipe down the print cartridge.**

   This step is shown in Figure 17-16.
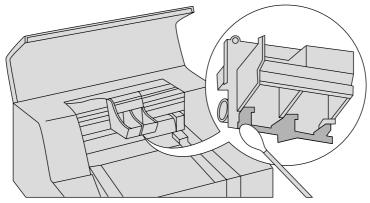
Figure 17-16: A cotton swab is perfect for cleaning your inkjet's cartridge cradle.

6. **Visually check the paper rollers for torn pieces of paper**.

   Remove any paper that you discover. Tweezers come in handy for pieces that are jammed at the end of the rollers.

7. **Visually check the ribbon cable and all internal wires.**

   Make sure that nothing has shaken loose and needs to be reconnected.

8. **Set the unit back upright and reload the ink cartridges.**

   Don't forget to make sure that the cartridges are firmly seated.

9. **Close your printer's cover, reattach the cables, and turn your printer on.**

Follow this procedure on a regular basis — once a month or so — and you'll extend the life of your inkjet printer and maintain its image quality for years to come.

Cleaning laser printers

Take care while cleaning your color laser printer because unlike an inkjet, a laser printer can reach high temperatures while it's in operation, and the delicate exposed parts require a light touch. Also, laser toner can be extremely messy if liberated from its cartridge — it can permanently stain clothing, and it can hurt kids and pets. Therefore, it's *very important* to read your printer's manual for additional instructions and warnings before attempting to clean your printer.

Here's a general cleaning procedure you should follow every three months (this applies to most laser printers):

1. **Turn off and unplug all cords from your printer.**

2. **Open your printer's cover and remove the toner cartridge.**

   If you have a spare cartridge box, it's a good idea to replace the cartridge in the box to prevent it from prolonged exposure to light.

3. **If your laser printer's corona wires are exposed, you can usually use a dry cotton swab to carefully wipe them.**

   Never use any cleaning solutions or fluids while cleaning these wires.

4. **Remove any torn pieces of paper from the paper feed rollers.**

   As shown in Figure 17-17, you can use a cotton swab dipped in alcohol to wipe excess toner from the rollers.

5. **Replace the toner cartridge and close the printer cover.**

Cotton swab ——
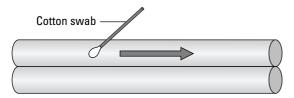
Figure 17-17: Use a cotton swab to wipe down the paper feed rollers in your laser printer.

6. **Use a can of compressed air to blow the accumulated dust from the** *outside* **of the printer's fan grille.**

7. **Close your printer's cover, reattach the cables, and turn your printer on.**

Cleaning and calibrating ink cartridges

Before you go any farther, heed this warning: *Never touch the nozzle surfaces or print head on an ink cartridge!* Any contact with your skin is likely to foul the inkjet nozzles, which will significantly degrade the print quality.

Having stated that, thought, most of today's inkjets include a nozzle cleaning feature that you can access from the manufacturer's driver or printer software. For example, Figure 17-18 illustrates the first screen of the two-stage Cartridge Cleaning Wizard for a Hewlett Packard PhotoSmart printer.
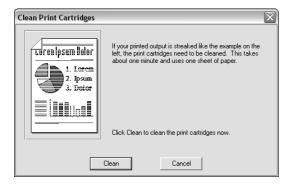
Figure 17-18: Preparing to clean the inkjet cartridges on an HP inkjet printer

HP photo-quality printers also include two different calibration features in the accompanying Toolbox software — one that can fine-tune the position of the photo paper tray, as shown in Figure 17-19, and one that can identify alignment problems with the cartridges and make corrections, as shown in Figure 17-20.
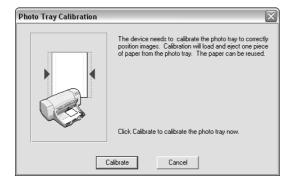
Figure 17-19: Calibrating the photo paper tray for precise orientation

Figure 17-20: The HP cartridge calibration feature can fix cartridge alignment problems.

Using a laser cleaning sheet

As mentioned previously, laser toner has a nasty way of sticking to just about anything — including everything that's on the paper path within your laser printer. Although this chapter explains how to clean the paper feed rollers and corona wires within your laser printer, many parts in your printer remain inaccessible to you but can still be reached by wayward toner.

To clean the entire paper path, I recommend using a *laser cleaning sheet* — these sheets can remove blotches and streaks caused by toner spills. By running a cleaning sheet through your laser printer (just like a regular sheet of paper) you can pick up both dust and excess toner; after you've used the sheet once a month for three months or so, toss it in the trash and open another. I use the laser printer cleaning sheets manufactured by ACL Staticide (`www.aclstaticide.com`).

Summary

In this chapter, I discussed the world of inkjet, dye-sublimation, and color laser printing for the digital photographer, including features to look for when shopping and how to install both parallel port and USB printers. I also covered the various common types of papers and inks used for printing photos, and I provided tips for optimizing your printer's performance and producing the best possible images with an inkjet printer. Finally, I demonstrated how to maintain and clean your inkjet and color laser printer.

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CHAPTER

18

In This Chapter

Color management
explained

Monitor calibration
and profile creation

Scanner calibration
and profile creation

Printer calibration
and profile creation

Optimizing images
for printing

Making and Using Device Profiles for Predictable Output

At one time or another, you've probably taken a digital photo, or scanned a photograph and viewed it on your computer. The image may have been exactly what you expected, but more often than not, you had a few surprises. You may have seen sky areas that were totally blown out, or shadows with no detail at all. People in the photo may have appeared ill because of a yellow-green cast on the image. If you printed the image, it may have come out just as you saw it on the monitor, or it may have come out as you originally expected to view the image.

What in the world is going on here?

Color Management

The answer lies in color management. To achieve predictable and acceptable results consistently, you must have three items:

✦ A calibrated monitor

✦ A profile for the input device

✦ A profile for the output device

If you only view your images on your computer, or place your images on the Web, the output device is the monitor. You can control what you see on your own monitor, but you have absolutely no control over anyone else's monitor or platform. Later in the chapter, I describe a slightly different approach to assessing and color-managing images for the Web.

The monitor

The "normal" CRT (cathode ray tube) monitor sends beams of electrons at phosphors located on the back of its thick glass. Three separate electron "guns" shoot their beams at three different sets of phosphors. Each set of phosphors is a solid color — red, green, or blue (RGB). When a phosphor has been "hit" by an electron, it gets "excited" by the electronic charge and glows. Depending on the intensity of the beam, the phosphor either glows a little or a lot. The spaces on the monitor that these phosphors occupy are called *pixels.* Macs display 72 pixels per inch (ppi), and PCs display 96 ppi. For this reason, a graphic from a Mac appears larger on a PC screen and a PC graphic looks smaller on a Mac. If you're Mac-based and surf the Web, you've undoubtedly noticed that some sites have extremely small text. More than likely, the site was built on a PC and is being projected onto your monitor at about 75 percent of its original size.

Several factors can affect the way your monitor displays an image, and even more factors determine how you perceive that display. For instance, the next time you are in the television section of a large store, notice the differences in color, contrast, and brightness between TV sets from different manufacturers. For the same reasons, two otherwise identical monitors from the same manufacturer can provide two different images. Ambient light, electric lights (whether they're incandescent or fluorescent), the location of the lights, reflections (including the clothes you're wearing), and the age of the monitor all play important roles in what you see on-screen.

Fortunately, you can calibrate your monitor yourself, basically for free. Or, if you have the money and take your images seriously, you can purchase a monitor calibration device and software to do the job. If you have a good eye, you can probably do just as good a job of calibration as the electronic devices — maybe even a better job! I go into more detail on monitors later in this chapter.

The scanner

Flatbed color scanners come in two basic types: one-pass and three-pass. Just as a monitor projects red, green, and blue light onto the screen, a scanner reads and records those colors from your photograph. The scanner unit travels along its rails at a constant speed and shines a light source on the image. As the light hits the image, it is reflected onto a series of mirrors that ultimately focus the light information through the scanner lens. The light is then passed to the CCD (charge-coupled device) where it is converted to analog voltage. This analog signal is converted into a digital signal that is transmitted to the computer through the logic board, resulting in pixels on your monitor. In a three-pass scanner, a pass is made for each of the

three colors. A one-pass scanner uses hardware and software that allow red, green, and blue information to be retrieved in a single pass.

Service bureaus and large printing houses may perform scans on a drum scanner that uses PMT light sensors instead of CCDs. PMT stands for *photomultiplier tubes* — vacuum tube technology. They provide excellent results, but are definitely on the high end of the price scale. Luckily for those of us with shallower pockets, the gap between PMT and CCD is becoming smaller all the time.

No matter what technology is involved, each scanner "sees" or interprets color in slightly different ways. This creates another glitch in the search for the optimal image. You need to know exactly how your scanner translates the color in order to make corrections to the image before you print it.

The printer

Ah, now the can of worms. Three basic types of color printers are in use today — inkjet, dye-sublimation, and laser. If you are not interested in PostScript printing capabilities, you can find an adequate color inkjet printer for under $200. Color laser printers start a little higher, and both inkjet and laser printers can run into five-figure price tags. Naturally, the level of quality goes up commensurately. Another type of color printer is the thermal wax printer. Because of the way this printer applies the image to paper, the colors are extremely vibrant and pure. However, inkjet printers seem to be the most popular, especially if photographic imagery is your main concern and price is an issue.

Cross-Reference   See Chapter 19 for more on the various types of printers.

Printers interpret information that comes in digital form and apply this information somehow to a piece of paper. Laser and thermal wax printers use CMYK (cyan, magenta, yellow, and black) inks for the imaging process. Inkjets can be CMYK, RGB, or RGB plus extra colors (such as magenta, yellow, and cyan for a richer, more vibrant image).

Consider how complicated this process can become. The scanner supplies RGB information to the computer, and you change the image into CMYK because you will eventually print this photo at a conventional printing house. However, you also want to proof it on your inkjet printer that prints in six colors. Every step of the way seems to be a potential obstacle in getting the photo printed at all. The final step — getting the film burned onto plates and the image ultimately printed on paper — contains two more opportunities that invite color interpretation problems.

The solution: Device profiles

Take heart — help is at hand everywhere you look. You can calibrate your monitor, and you can use the manufacturer's information provided with your scanner and printer to get all of these devices speaking the same language. The information

about how a particular monitor, scanner, printer, or printing press deals with color is called a *device profile.*

A device profile is a small file that contains information that the computer uses to understand how a given piece of equipment deals with color. The profile is a vendor-neutral, cross-platform color management system. Because each device has a different color range, the profile acts as an equalizer or translator across platforms and products. The ICC (International Color Consortium) profile specification was created and is monitored by the ICC. Eight major companies — Adobe, Agfa-Gevaert, Apple, Kodak, Microsoft, and Sun Microsystems — formed the ICC in 1993. Taligent and Silicon Graphics were the other two founders but they dropped their membership in subsequent years. If you want to learn more about ICC, you can visit its site at www.color.org.

Introduction to Color Management Systems

No single device can reproduce all the colors that humans can see. Each step in the digital photography process can yield a different view of color. Some devices see or print more reds, and others have more blues. For example, suppose that you take a picture of a red rose with a green background. Your digital camera sees a deep vermilion rose with a darker green background. Your monitor shows a bluer, almost purple rose, with a blue-green background. Your printer prints a slightly orange rose with a bright green background. Without a Color Management System (CMS), these discrepancies can occur.

The colors that a particular device can display or produce are said to be within *gamut.* Non-reproducible colors are called *out-of-gamut.* When a device is presented with an out-of-gamut color, the device will do the best job possible with the software it has to approximate the color. With CMS, you can end up extremely close to the red rose on the green background that you saw originally. Keep in mind that the entire concept of color management is highly contentious — opinions abound — so use this information to make your own choice.

What comprises CMS?

You must remember that the use of CMS doesn't alter your image in any way. You aren't changing the color in your image or adjusting its range of colors. You are, however, providing each device in the chain of events with information about the other devices in such a manner that you can make an informed judgment about the image before you go to final output. In this environment, you can modify colors and values with the knowledge that your printout will be faithful to what you see on the monitor. During each step of the process, the profiles interpret the color information — whether it is data from the scanner, the image on the monitor, the output from an inkjet or laser printer, or results from a commercial printing press — to provide optimal output. Many manufacturers have developed software that does the conversion for various devices, called the *color management engine* or Color Matching Module (CMM).

Color modes

There are five basic color modes. As described earlier, the RGB mode consists of red, green and blue light. Each factor of the light is divided into 255 steps of brightness. (Full strength is 255, and a total lack of light is 0.) As various levels of RGB lights are added to each other, they create the colors we see on the monitor. Each of these color modes result in a different *color number.* A very bright red in RGB mode is 255r, 0g, 0b; in CMYK, the color number is 0c, 98m, 83y, 0k; in Lab mode, the color number is 63L, 90a, 78b; and in HSB, the color number is 0h, 100s, 100b. On the Web, the color number is FF0000. Because each device in your workflow also perceives these colors in a different manner, the ICC created the system for developing *color profiles* so that color remains standard across all platforms, programs, and devices.

CMS is not software or hardware. CMS is a small recipe each device uses to create or display colors. A Microsoft Word file has information in a header that you never see, but that information tells the computer that this is indeed a Word file, not a Word Perfect or HTML file. CMS works the same way with unique tags that you don't see, but they tell the monitor how the scanner interpreted colors and let the printer know what it must do to provide the color the user expects to see.

These profiles can be embedded in documents as the document is opened in Photoshop, if you have the settings configured to do so. Go to Edit ➭ Color Settings, and check the box that says "Profile Mismatches: Ask When Opening." After making this selection, you will be asked to apply a profile, to accept the document's profile (if it has one), or disregard color management altogether. If you choose to embed the profile, the document becomes *tagged.* A tagged document carries the ICC profile with it from one program to another, and from one computer to another. I may be overstating the obvious, but just so you know, an *untagged* document has no ICC profile and contains only raw color data. When you open an untagged image in an image-editing program, you view it in whatever working space the program is currently in. At any time, you can open Edit ➭ Color Settings and select or change color profile settings. You don't have to be a rocket scientist to see that passing untagged images between workers or computers is a recipe for disaster.

You may not want to use color management, however, for several reasons, including the following:

✦ **You only work with Web-destined images.** Because you can't possibly control how people in other parts of the world calibrate their monitors, let alone their viewing conditions, attempting to create the perfect image is probably a waste of your time. This doesn't mean that you can't use CMS; it only means that your results will be consistent on machines in your environment, but out of control when viewed on the Web. If this is your situation and you use Adobe Photoshop, you can use the Web Graphic Defaults setting, which complies with the average RGB settings of most monitors.

✦ **Your printer or service bureau prefers to work with proprietary CMYK values for their specific printing conditions.** Some software and printer manufacturers actually suggest that you work with color management *off* in certain program/printer arrangements.

✦ **You don't plan on repurposing your images.** In other words, you control the final output, and the image won't be sent to another artist, photographer, or printer for output or alteration. However, suppose that you took photos for a catalog that is going to be printed by a commercial printer, and at a later date, the catalog must be put online. The repurposing of the images from CMYK TIFFs back to RGB JPEGs may create a lot of heartaches for you without CMS in place. Colors may vary a little or a lot.

Here is a general rule to follow when considering the use of CMS: The more devices, computers, and operators that handle an image, the more likely a candidate you are for a serious CMS regimen. If this describes you, then jump into the next section to create some profiles.

Source profiles

The *source profile* is the profile of your digital camera, scanner, or monitor. The profile may be embedded in the file (tagged), and tells the CMS that this RGB data is from a particular scanner or monitor. The profile tells the computer what the colors really look like. Your scanner came with a profile that you should use. If the scanner starts giving you strange but predictable color errors, you can modify the profile as described in Chapter 8.

Target profiles

The target profile can be about the monitor, a laser printer, an inkjet printer, or a commercial press. This profile contains information on how the target device perceives the color and how it is output — whether through pixels on a monitor or halftone dots on paper.

The target profile can also be created by following specific instructions within your photo editing software, to compensate for different colors of paper. For example, a newspaper stock is much grayer than typical magazine stock. Papers are graded (and priced) according to their level of whiteness. Below the brightest white stock, printing papers have varying colorcasts from blue to yellow to red. Commercial printing inks are transparent, and the color of the paper stock affects the way the printing appears. If the stock has a yellow cast, then light blue skies can turn slightly green (and more than likely, you don't want that). To compensate, you can create a profile for each stock that you use so your image-editing program won't create bizarre effects when your images come off the printing press.

Rendering intents

If your printer can't reproduce a particular shade of red, then you can logically assume that your printer's approximation of that color will appear distorted. To deal with these out-of-gamut colors, programs such as Adobe Photoshop provide rendering intents.

Corel PHOTO-PAINT provides Perceptual and Saturation Intents and Automatic Intent. The first two have the same basic definition; PHOTO-PAINT uses Perceptual

Intent for photographic or bitmap images and Saturation Intent for vector-based artwork. Automatic Intent is the program's default and makes a software decision for the best way to proceed. Adobe Photoshop and Photoshop Elements have all four of the following rendering intents:

✦ **Perceptual Intent:** The source space is converted to the target space so that the general appearance of the image looks natural to our eyes. To accomplish this, some or all colors may be made darker or lighter and have more or less saturation. Most photographic images can use this intent with good results. See Figure 18-1 for a comparison of the four rendering intents that Photoshop provides. Keep in mind that grayscale reproduction doesn't do justice to the differences in appearance that rendering intents provide.

Figure 18-1: From left to right, the images have Perceptual, Saturation, Relative Colorimetric, and Absolute Colorimetric intents.

✦ **Saturation Intent:** Suppose that, during your trip to the Bahamas, you took a picture of a clothesline hanging with bright yellow dresses, brilliant red shirts, iridescent green stockings, and startlingly white t-shirts in front of a turquoise building beneath an azure blue sky. Saturation intent would be a good method to use to render the image. These colors are more than likely fully saturated at the expense of the real colors in the image (grass, tree bark, clouds). The saturation intent converts the source colors to the target colors without paying any attention to the hue or lightness of the image. Bright, vivid colors are the result. You wouldn't want to use this on a photo of Aunt Marge unless you're tired of her annual fruitcake—she won't like what it does to her skin tones, and she'll cross you off the gift list. This rendering intent should come with a warning: "Colors in this image are not as vibrant in real life."

✦ **Absolute Colorimetric Intent:** Any colors that lie within the target gamut are unchanged with this intent. The process involved in this intent is to keep the majority of the color accurate while modifying out-of-gamut colors considerably. If the target gamut is smaller than the source gamut, colors that are different but fairly close can become a single color in the target space. In order for this method to be optimal, the white point of the image must be set correctly. The white point can be a specular highlight, or any other area in the photo that doesn't contain color.

✦ **Relative Colorimetric Intent:** This method converts the white point in the source gamut to the white point in the target gamut. In the case of printing, the white point is the paper or substrate on which you scan and/or print. In-gamut colors are produced faithfully, and out-of-gamut colors are reproduced as closely as the software can get. If you know that the photo you are scanning has a particular colorcast—due to age, for instance—or your ultimate printing paper has a colorcast, then this is the best rendering intent for you. Relative Colorimetric Intent does a better job of reproducing "normal" colors if the image doesn't contain many out-of-gamut colors, or if the out-of-gamut colors are not significant. When used in conjunction with Black Point Compensation (in Photoshop's Color Settings dialog box), color relationships are preserved with a minimal loss in color faithfulness.

When you use rendering intents, you'll see changes in the image on your monitor. Remember, however, that the image itself has not changed—only the way it is being displayed. Using rendering intents simply allows you to make accurate changes in your image and to achieve optimal results at each step along the way.

Monitor Calibration and Profile Creation

Just as hair turns gray with time, monitors also show signs of aging. If you're so inclined, you can dye your hair—if you're lucky enough to keep it in the first place. But when a monitor starts changing colors, about all you can do is replace it. After a certain point, no amount of tweaking and calibrating will revitalize an old monitor. The screen will get progressively dimmer as the phosphors wear out. Depending on which phosphors go first, you can end up with a noticeable color shift as well. When this happens, dig deep and get yourself a new monitor.

Your environment also affects what you see on-screen. If your monitor faces an open window, colors and brightness on the monitor will be different than what you would see if your monitor were located in a dimly lit room. This discrepancy is related to the adjustments that your eyes have to make. Think about it—have you ever watched a movie in a theatre that kept the house lights on? The image on the screen is washed out and dull. The same concept applies to monitors. If color is critical in your work, you should have minimal ambient light in your workspace. The perfect workroom faces south so that the sun doesn't create moving light across your room. This light can cause reflections on the monitor and colorcasts. Your eyes make adjustments to those bright or colored areas that can really make a mess out of your image's color enhancement. Many graphics professionals have

shades on the top and sides of their monitors to further block ambient light and glare. Some monitor manufacturers offer models with plastic hoods, but I've gotten along fine for years with a piece of foam board painted flat black. It does tend to make you more prone to tunnel vision, however.

If you have incandescent lighting in your workspace, colors will appear differently than if you installed fluorescent lights or turned the lights off. Watch for glares from the overhead lights, too.

When I take a photo of a highly reflective object, I never wear a white shirt or light colored clothing of any kind because they will be picked up in the reflections on the object. The same holds true when working in front of a monitor. If you're wearing a bright white blouse or shirt and the sun is streaming through the window and onto your face, the light reflected off your clothing will show up on the monitor. Image editing becomes nearly impossible to do.

If you calibrate and create a profile for your monitor in your home office and end up taking the monitor to your business office, you should make a new profile for that location. Calibrating your monitor once a month just to keep on top of the situation is a good habit to get into.

Software programs differ in their approach to calibration and the creation of device profiles. In Jasc's Paint Shop Pro, you're pretty limited to the Color Management controls within Windows 98 and later versions (not possible in Windows 95). Photoshop has great tools, including Adobe Gamma. Corel Photo Paint is similar to Photoshop.

You can calibrate your monitor in one of two ways. If you're timid about the process, you can buy a calibration device and software, or you can just do the job manually. If you take your time and pay close attention to what's going on, the manual process works just fine — every bit as well as the electronic devices. The bottom line is that you either depend on software to do the job for you, or you use your own eyes as the ultimate judge. Neither method is difficult, and it only takes a few minutes.

Whichever method you choose to use, you should perform a few tasks in order to achieve the best results:

✦ Have the monitor on for at least an hour before calibrating in order to make sure it has warmed up completely.

✦ Make sure the monitor's screen is clean and streak-free.

✦ Remove the fancy background image you have on the screen and replace it with a neutral gray, pattern-free screen. You can switch back after you're done calibrating, although your editing efforts will be easier and more accurate if you keep the background gray and uncluttered.

✦ If you have more than one monitor connected to your computer, be sure to adjust them both to the same white point (5,000 degrees K or 6,500 degrees K) and calibrate them at the same time.

Calibrating by eye

The term "calibrating by eye" is a little misleading because you use software and methods from major manufacturers. If you have Adobe Photoshop or Photoshop Elements, you also have Adobe Gamma on your computer. It was installed as part of the program's installation process. In Windows, you can find Adobe Gamma in the Control Panels folder or in the `Program Files/Common Files/Adobe/Calibration` folder on your hard drive. In Mac OS 9, you can find it in the Control Panels folder from the Apple menu. In OS X, you can access it in `System/Control Panels` folder. Double-click the icon to start the program.

When the Adobe Gamma dialog box appears, as shown in Figure 18-2, you are immediately faced with a decision — do you want to go through it step by step, or use the Control Panel method? You perform the same steps with either method, but if you choose Control Panel, you have to go through the steps manually. If you're comfortable calibrating your monitor, you can use this method to quickly run through the routine. If you run into trouble, you can call on the wizard in Windows or assistant in the Mac OS; both lead you through the process one option at a time.

Figure 18-2: The Adobe Gamma start-up screen

Choose Step by step and click the Next button. Your monitor probably came with a profile, and you should choose it in the dialog box, which is shown in Figure 18-3. If you can't find a profile for your monitor, then you need to go online to the manufacturer's site and download the pertinent phosphor information.

Set the contrast on your monitor (one of those knobs, wheels, and buttons that you've been ignoring for months) to its highest setting. Then you can tackle the brightness settings. In the dialog box, you see a black square inside a white square, as shown in Figure 18-4. Adjust the brightness control until the center box is dark as possible — but not totally black — and the white box stays white — not gray.
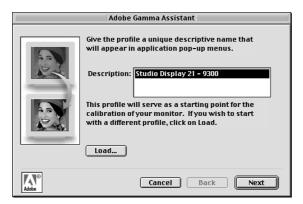
Figure 18-3: Choose your monitor to begin the calibration process.
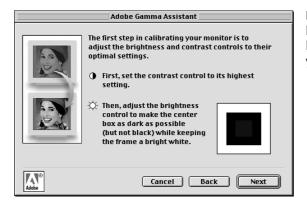
Figure 18-4: This window helps you get the correct brightness and contrast on your monitor.

The next window shows you the monitor profile that is currently active. If you think it's wrong, you can change it. Double-click the name to bring up the window shown in Figure 18-5. In this window, you can input the data that you downloaded from a manufacturer if you were missing a profile. The x and y values indicate the color's position in a *chromaticity chart.* A chromaticity chart maps the full range of visible color and the gamuts of various input and output devices. It's probably not a good idea to change these numbers just to see what happens—if you lose the correct settings, you'll have to start the calibration process again.
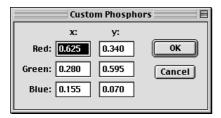
Figure 18-5: You can create custom phosphor profiles here by inputting RGB values.

Following the profile selection, you adjust the actual *gamma* of your monitor. Gamma is a measurement of the brightness of your midtones. In the middle of the window, you see boxes that contain thin horizontal lines with a smaller box within them. Moving the slider makes the inner box darker or lighter, depending on the direction the slider is moved. You must adjust it until the boxes merge with their backgrounds, and the easiest way to accomplish this is to squint. When you can't see the boundaries of the inner box, you've adjusted the gamma correctly. Next, set the gamma in the menu. The Macintosh gamma default is 1.8; in Windows, the gamma is 2.2.

More choices await you in the next window. Here you set the white point of your monitor. The dialog box shows what is currently set, but you can change the setting in the drop-down menu, or choose Measure. If you select Measure, the monitor turns completely black, and you see three gray squares in the middle of your monitor, as shown in Figure 18-6. You then choose which of the squares is the most neutral gray. Click the neutral square to move it to the center. If the new square is more neutral, then click it; repeat the process until you're satisfied. After you finish, click Enter or Esc to return to the Adobe Gamma Assistant.
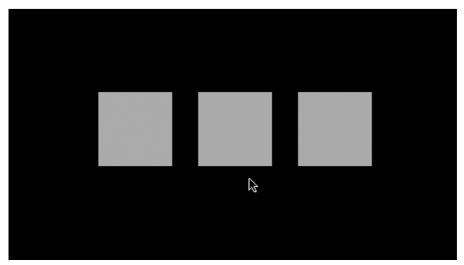
Figure 18-6: These three boxes are various colors of gray. You must decide which is the most neutral gray.

The next screen, shown in Figure 18-7, allows you to choose a white point to work with. Most color-critical work is done at 5,000 degrees K, and this is the setting you should use on a Windows machine. If you're on a Mac, 6,500 degrees K will provide better results.

The last screen contains two buttons that allow you to see both the settings you had before the calibration and the settings that you just created. If you're satisfied with the monitor's new look, choose Save the Profile. Use the name of the monitor and the current date in the profile's name so you can keep track of the prevailing profile.
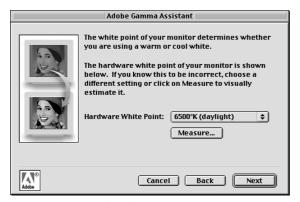
Figure 18-7: Set the white point of your monitor.

Electronic sensor calibration

A few brands of calibration devices are available on the market. They all work pretty much the same way by taking the guesswork and subjective judgment calls away from you and handling it electronically. In this section, I walk you through a calibration sequence using a Spyder™ from PhotoCAL™. PhotoCAL™ is a product of ColorVision™, which is owned by PANTONE®. The Spyder is an extremely well designed and manufactured device. Fresh out of the box, the main unit is assembled to calibrate an LCD monitor. All that's necessary is to snap on the LCD hanger and counterweight, and you're ready to tackle the LCD screen. Calibrating a CRT requires you to remove a circular filter from the face of the Spyder and add a flexible mask. After you've installed the software from the CD and restarted the computer, it's pretty much a wait-and-see operation.

On a Mac, open the Monitors Control Panel, select Color, and then click the Calibrate button. You have a choice of ColorSync or the PhotoCAL method. Choose PhotoCAL.

If you are running Windows, look in the `Programs/PANTONE COLORVISION` folder for PhotoCAL. On a Windows 2000 machine, an alias for PhotoCAL will appear on the desktop. Double-click the icon to start the program.

The program starts by telling you that you are going to adjust the contrast and brightness and then the gamma and color temperature. Then you are asked to select the type of monitor you're calibrating: CRT or LCD.

The next two windows ask you to set the monitor's gamma and color temperature. For the gamma, you have a choice of 1.8 or 2.2. As in the manual method, Mac users should choose 1.8, and PC users select 2.2. The color temperature window allows you to pick from 5,000 degrees K or 6,500 degrees K. Here again, with the platform difference comes a slight controversy. Most graphics professionals recommend using 5,000 degrees K. If your present monitor gives you satisfactory whites — meaning, no yellow cast — then stick with 5,000 degrees K. However, you will

probably be happier using 6,500 degrees K, even though your whites will be a tad blue. The next screen asks you to adjust an LCD monitor to factory default settings, and CRT monitors are adjusted using the monitor's controls.

With a CRT, you adjust the contrast and brightness in the next window by turning the contrast all the way up using the monitor's controls. The Set Brightness window contains a large rectangle made up of four gray blocks. Adjust the brightness control on your monitor until the four blocks of dark gray are discernable, but not distinct as shown in Figure 18-8.
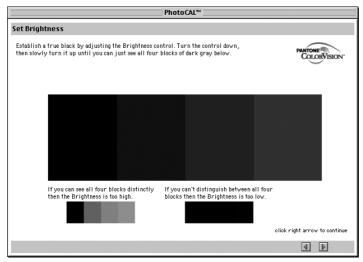
Figure 18-8: This window helps you adjust the brightness of your monitor.

Next, the program asks you a question that may send you off searching the monitor's controls. You have to tell the program whether the monitor allows you to set individual levels for R, G, and B; whether it has presets for 5K, 6.5K, or 9.3K; or whether it has no controls for color temperature at all.

That was the hard work. From here on out, it's all electronic, and about as exciting as watching the lawn grow. You are asked to attach the sucker device to the window in a designated position on a CRT monitor, similar to that shown in Figure 18-9. If you are working with an LCD monitor, then the hanger and counterweight must be adjusted to place the Spyder in the correct location as shown in Figure 18-10. Be extremely careful not to press on the LCD screen. *(Do not use the suction cups on an LCD monitor.)* The window behind the Spyder turns black, and then in gentle increments, slowly turns to the brightest red that your monitor can create. It goes through the same routine with green and blue, and then repeats the process. Then it does a couple passes of black and white and starts to create the profile for the monitor.
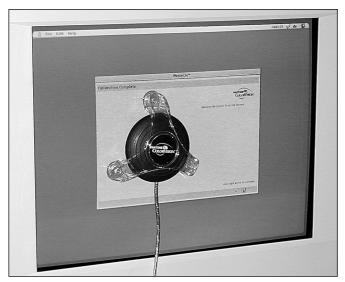
Figure 18-9: The PhotoCAL™ Spyder™ calibration device is attached to a CRT monitor with four suction cups.
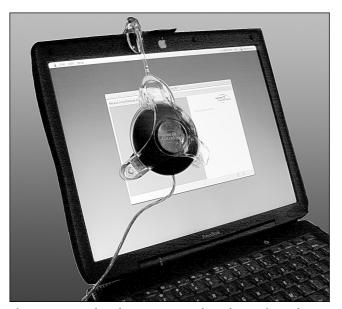
Figure 18-10: The PhotoCAL™ Spyder™ hangs from the top of an LCD monitor with a counterweight dangling over the back.

The last step in the calibration process allows you to name your new profile. A Windows NT4 computer saves the profile in the directory with the PhotoCAL application. Windows 98, 2000, or XP adds the profile to the list of monitor profiles in the Display Settings Control Panel. The new profile will be set as the default monitor profile. On a Mac, the profile is saved in the ColorSync Profiles folder within the System folder. As you're leaving the PhotoCAL program, you can select the new profile from the list in the Monitors dialog box.

If you're doing work that is color-critical, you should calibrate your system at least every two or three weeks to keep on top of monitor performance and age. Eventually, when you just can't get rid of the dingy white cast in the whites, put the poor thing out of its misery — give it to the kids for their games — and buy yourself a new monitor.

Scanner Calibration and Profile Creation

Scanners come with a few different types of color management sophistication. Low-end models have no color management at all — you simply operate the scanner and bring the raw RGB data into an image-editing program to optimize the color. Basic color-managed scanners work by creating a scan into your monitor's color space. The most efficient workflow, however, comes from a fully color-managed scanner. The scanner's profile is unique to that model scanner, and you should use that profile unless you know that the light source has somehow changed with time or use. You should also check the scanner manufacturer's Web site occasionally for the latest scanner driver update.

If your scanner didn't come with a profile, or if you are a masochist, you may want to create your own profile. In order to do so, you must turn off all the scanner's auto-correction features. At this point, it will deliver raw, high-bit RGB data to the computer. This means that your target profile basically consists of your RGB working space. The problem is that some low-end scanners don't give you the option of turning auto-correction off, so you're stymied. If you want to create your own profile for higher-end scanners, be warned that by bypassing the manufacturer's profile, you may be losing color information due to the different gamut of your monitor. If the monitor's sense of RGB is significantly different from the scanner's capabilities of capturing RGB, you have succeeded in eliminating color that may have been usable further down the line, such as in CMYK printing.

Most users will be better off by just scanning the image and getting all the information the scanner can provide. Use all the contrast/brightness features of the scanner during the prescan stage so the image is as strong as it can be. Then bring the image into a program such as Adobe Photoshop. Depending on the defaults you have set in Photoshop, you may be asked about the image's profile as it opens. You can assign a profile that fits your workflow and save yourself a lot of work. If you know you are going to take the image straight to the Web, then you can use your

monitor's profile. On the other hand, if you are going to do in-house printing on your Epson Stylus Photo 1280, using its profile will work out perfectly. If the job is going to be printed in Japan, for example, you can choose a specific printer profile that will show you how the image will appear when it's printed with Japanese ink formulas.

If you are using Photoshop or Photoshop Elements, you can enable the Missing Profile warning enabled in the Color Settings dialog box, as shown in Figure 18-11. Then, when you open a document for the first time, you are able to set your scanner's profile and have the document converted to your working RGB in the dialog box that pops up, as shown in Figure 18-12.
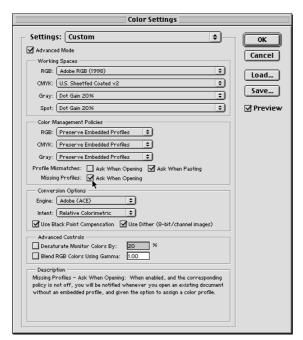
Figure 18-11: You can have Photoshop ask you what to do when an untagged image is about to be opened. The cursor is over the Missing Profiles/Ask When Opening option in the Color Settings dialog box.

If you don't have Missing Profile defaulted, then you can go to Image ➪ Mode Image ➪ Assign Profile. This action brings up the dialog box shown in Figure 18-12. From this dialog box, you can choose from any of the profiles in the list that apply to your workflow. Then go to Image ➪ Mode Image ➪ Convert to Profile to choose your working RGB profile. Notice the options that are available in this window, as shown in Figure 18-13.
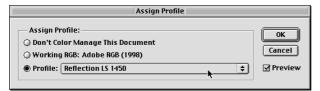
Figure 18-12: The Assign Profile box enables you to turn off color management on this image, assign the current working space, or select a profile from the drop-down menu.
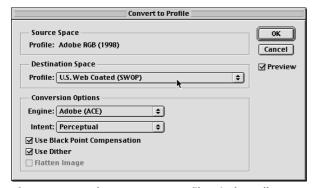
Figure 18-13: The Convert to Profile window allows you to change current settings to a variety of profiles.

The job of creating a scanner profile is not for the faint of heart or inexperienced user. The implication of performing such as task is that you know more about the color that your scanner can collect than the scanner manufacturer knows. However, if you know that your scanner's lamps have gotten old and dim, or that they have picked up a colorcast, then by all means set up your own profile. To do so, follow these steps:

1. **Scan an image with known values, such as a Kodak Q-60 Color Input Target, as shown in Figure 18-14.**

2. **Set the monitor profile as the source and RGB Color as the destination profile.**

   Unfortunately, this has the result of limiting your scans to the color gamut of your monitor. This gamut is usually smaller than the scanner's gamut, so you will be losing color that the manufacturer's profile may have provided.

3. **Prescan the image and color-correct as much as you can within the scanner's software.**

4. **Get the most tonal range and contrast that you can get from the scan.**

Figure 18-14: The Kodak Q-60 Color Input Target helps you create an accurate scanner profile.

5. **Create a profile and set the software's default to embed the profile in the files.**

   Then, when you bring it into your image-editing program, you can work on saturation and color balance problems that you couldn't deal with in the scanning process.

Printer Calibration and Profile Creation

When you upgrade your operating system, or even change from PC to Mac platforms, you need to update your printer drivers and change the profiles, as well. Before doing any color-critical work, go online and download the most current versions. This action assures you that the information coming from the computer will be reproduced as faithfully as possible on a given machine.

Just as you need a properly calibrated monitor and scanner, you also need a properly calibrated printer. Most printers come with instructions for the calibration process, which usually involve printing a built-in or canned image that is compared to a hard copy provided with the printer's literature. You can then adjust the amounts of ink that are laid down until they match the control copy. When your printer produces output identical to that from the manufacturer, the printer is calibrated.

Printing with Color Management in Photoshop

To set up the correct profiles for printing, go to File ➪ Print Options, then check the Show More Options box. The drop-down menu allows you to choose Color

Management or Output; select Color Management. You also see a section for the Source Space and another for the Print Space, as shown in Figure 18-15. Choose Document as the Source Space to ask the printer to reproduce the image as you see it on your monitor. The Proof option prints as close as possible to how the image appears when coming off of the device that you've selected. In the Print Space box, Profile lists many devices and paper/printing press types. The Intent choices are Perceptual, Saturation, Relative Colorimetric, and Absolute Colorimetric (see the section on these options earlier in this chapter).
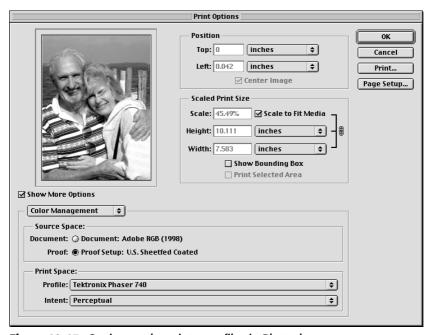
Figure 18-15: Setting up the printer profiles in Photoshop

By using various combinations of these options, you can get a hard copy of your image as it should appear when it's finally printed. If the document is to be printed on newsprint instead of glossy magazine stock, or even to be sent overseas where the ink formulations are different than in the United States, you can get a pretty good idea what the job will look like. This is due to the fact that Photoshop will apply the various profiles — say for newsprint stock — as the document is sent to your desktop printer. In the case of newsprint, the image printed on your laser printer will show a graying of the background, and colors will appear dull — just as they will in "real life." Then you can make intelligent adjustments to the image before you send it out.

You have two more choices on the list of profiles that you can choose from:

✦ **Same as Source:** If you have already converted the image to the output space, then you should select this option because it makes no additional conversions to the image.

✦ **PostScript Color Management:** If you have a PostScript printer, this option is PostScript Color Management. If you have a non-PostScript printer, then it's called Printer Color Management, and it sends source data to the printer along with the profile information. This method uses the printer's software to manage the color instead of what you can do in Photoshop. You probably don't want to use this method because of the different ways PostScript handles color management within PostScript Level 2 and 3.

Optimizing images for printing

A few years back, a movie called "The Big Picture" came out. In it, a young writer/wannabe director (Kevin Bacon) was pitching a movie that he wanted to be shot in black and white. In the movie, the producer tells Kevin Bacon's character that shooting the movie in black and white isn't a good idea because all theaters have converted to color projectors. I think of that scene just about every time I adjust the black and white points of a color image.

You can do many things to create image perfection, but here are the basic steps involved in getting the most out of your image:

✦ Set white and black points

✦ Adjust gamma

✦ Remove dust and scratches if necessary

✦ Sharpen the image

✦ Optimize file size

Other chapters explore the first three tasks, but in the next section, I explore a couple of programs that make the last two jobs much easier than using commands in your photo-editing program. For sharpening, I explore nik SharpenerPro. If you want to repurpose your image — that is, put it on the Web now, print it in a CMYK brochure from a commercial printer, then create Giclée prints to sell later — then you should know that Lizard Tech's Genuine Fractals PrintPro 2.5 can't be beat.

Sharpening an image

You probably know how the four Sharpen filters in Photoshop differentiate, but just for basic review, sharpening increases the contrast between adjacent pixels in an image. When colors abut each other, our eyes make subtle adjustments and merge the colors at their border. This creates a softening effect in our mind. Using a Sharpen filter raises the contrast along the border by either lowering or raising the darkness of the colors of pixels immediately adjacent to the border. With a hard edge, our eyes have something to differentiate the two colored areas; it becomes sharp in our minds.

✦ The Sharpen filter performs this action over the pixels in an entire image for an overall sharpening effect.

✦ Sharpen More is just a bit stronger of an effect.

✦ Sharpen Edges leaves large areas of color soft while sharpening their edges.

✦ Unsharp Mask is by far the most useful of the four filters. This filter is mainly intended for edges, but creates a dark and light line on each side of the color border. The sharpening effect is quite pronounced, but you should take care not to overdo it because artifacts can crop up in the image and ruin it in just a couple of mouse clicks. Unsharp Mask is a term left over from the days of darkroom tricks with film negatives and positives in commercial printing.

For most purposes, these sharpening filters are good enough. If you want to get the sharpening done quickly, efficiently, and consistently, however, you can certainly use the program that I discuss in the next section.

Going beyond "good enough"

It hasn't always worked out that way, but I've tried to keep a motto of "Good enough isn't" in my work. This is what's so exciting about nik SharpenerPro (I'm not being cavalier about capitalization — the company doesn't capitalize the name). You may have learned a trick or two about the Unsharp Mask filter, but nik has created a plug-in that takes sharpening to another level. The program lists for $329, but is worth every penny. Two other available versions of Sharpener are less expensive — the least expensive of which is nik Sharpener Inkjet/Internet at $199, which sharpens for inkjet printers and Web imaging only.

SharpenerPro does four types of image sharpening:

✦ Color laser printing

✦ Inkjet printing

✦ Internet imaging

✦ Offset printing

Each of the sharpening types have an Autoscan feature. All but the Internet selection have manual controls that allow you to go beyond what the program has ascertained is the optimal image sharpness.

SharpenerPro has a working philosophy when it comes to the manner in which the program accomplishes sharpening. I hate to get into semantics, but it's necessary in order to use the plug-in efficiently. To quote nik, the plug-in "does not focus on maximizing the sharpness of an image. Rather, it maximizes the appearance of the image through sharpening the image optimally." If you read that statement two or three times you may still be confused, but the premise of SharpenerPro is that before you sharpen the image, you decide the size at which the image will be reproduced. Then you make the decision as to how it will be reproduced, and you have

four choices: color laser, inkjet, Internet, and offset. Then you start SharpenerPro, and based on image size and the method of reproduction, the plug-in will optimally sharpen the image.

In other words, SharpenerPro doesn't just run an Unsharp Mask filter on the image with maximum values and call the image sharpened. The plug-in provides a different sharpness for each type of reproduction, thereby giving you a great image wherever you use it. You can also utilize the program in a Photoshop Action, so you can do batch processing of many images at once, thus making it a very important tool in your image-editing toolbox.

Note Don't use SharpenerPro to sharpen an image that you have scanned from a magazine or newspaper. Sharpening those halftone dots is just not going to give you an adequate image!

nik SharpenerPro! workspace with Autoscan

SharpenerPro opens a new window. As previously mentioned, you have already declared the exact size at which the image will be reproduced. The image can be in CMYK, RGB, or grayscale color modes. The controls are arranged on the left, and the image is in a window on the right, as shown in Figure 18-16. Above the image, on the top right corner, you see a number and plus and minus signs. The number relates to the size of the image, and you can use the plus and minus signs to enlarge or reduce the view of the image in this window. This may sound exciting, but keep one simple thing in mind: The image is being sharpened for the manner and size in which it will be output. Therefore, what you see on-screen doesn't have a lot to do with reality. This is not WYSIWYG (what you see is what you get). You're going beyond that in SharpenerPro.
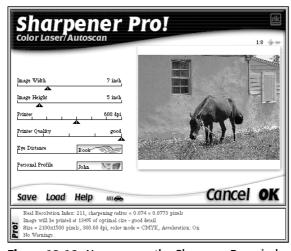
Figure 18-16: You can use the SharpenerPro window for optimally sharpening an image for color laser printing.

Dimensions

Underneath the plug-in title, you are reminded of how you're planning to output the image. Beneath that are the first two adjustments, Image Width and Height, as shown in Figure 18-17. The image shown is 7 inches wide and 5 inches tall. If you decide to change the output size at this stage of the work, the aspect ratio of the image remains constant — move one slider, and the other follows proportionately.

Image Width	7 inch
▲	
Image Height	5 inch
▲	

Figure 18-17: The Image Width and Image Height sliders

Printer information

The next two sliders concern the dots per inch (dpi) output of the inkjet or laser printer and the lines per inch used by the offset printer. You also get to decide on the printer quality, as shown in Figure 18-18. You must be the judge as far as the quality goes, and this is not a good place to "fudge." Even if you paid a lot for your printer and want it to print high quality images, it may not. An offset printer in the strip mall down the street is not going to print the same quality images as the printer with 6-color presses. Also keep the paper stock in mind. The results can be wildly different when printed on plain bond, recycled stock as opposed to coated paper. Be honest with your assessment of the image and the printer's output while you're working in SharpenerPro.

Printer	150 lpi
▲	
Printer Quality	above average
▲	
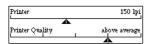
Figure 18-18: Printer information varies depending on the output device chosen.

> **Note**
>
> If you are printing to a black and white laser printer with a resolution of 300 dpi, use the Inkjet Sharpener 360 x 360 dpi setting. For a resolution of 600 dpi, use Inkjet Sharpener 720 x 720 dpi, and for printers with resolutions above 1,000 dpi, apply the Offset Print Interface with an appropriate setting.

Eye distance

SharpenerPro provides five different viewing distances to further optimize sharpness. The developers realize that images are viewed at different distances, depending on the use of the image. For example, a catalog, brochure, or book is viewed at a maximum of arm's length, but a large poster may be viewed from several feet away. Each of these scenarios requires a different type and degree of sharpness. The preset distances are book (shown in Figure 18-19), small box, large box, small poster, and large poster. Again, you must make an honest assessment of the image's most common use.

Frankly, I have a philosophical problem with the difference between book and small box ranges. Small box is defined as a product on a store shelf. The first time the image is seen, it is at "small box" range, but then the box is in the consumer's

hands, or "book" range. You simply have to test print the variations in order to be the best judge for a particular image, and how important it is at a given range. Each time you click the graphic icon, you are cycled to the next viewing distance.
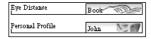
Figure 18-19: You can decide viewing distances and degrees of sharpness by clicking these two icons.

Personal profile

We all view graphics differently, and make adjustments that suit our frame of mind and personal style. The people at nik realize that, and have provided us with three points of view or options in the form of personalities. Anna is pretty conservative—maybe even timid, and likes a softer image. John has been around for a while, and knows that his work has to appeal to a broad range of people. His sharpening is a little stronger, but not aggressive. Zap is a happening guy, and wants to be on the bleeding-edge. He does a lot of Web work, and sharpens his images just a bit more than his co-workers. The difference between Anna and Zap (A-to-Z) isn't as great as you may think— probably less than 20 percent. You get to be the judge again. John is the program default and probably provides a good solution for most images and uses. As with the eye distance setting, each mouse click and drag on the graphic takes you to the next person's profile. To see the thumbnail image in a before and after setting, click and hold the mouse down on the thumbnail. The unsharpened image will appear. Release the mouse to see the sharpening that will occur if you accept your settings.

Save, Load, Help, and a Car?

The menu at the bottom of the window offers several options:

✦ **Save:** When you arrive at a configuration that will work on many of your images, you can save it as a preset. Click the Save button to bring up a standard Save dialog box, and you can navigate the preset to the folder that you want to use.

✦ **Load:** Click on Load to find any presets that you may have.

✦ **Help:** The Help button brings up a nine-page SharpenerPro Help document that covers the basic operation of the plug-in.

✦ **Car:** What's up with the car you see in Figure 18-20? The car indicates the speed at which the program analyzes and sharpens each image. Two speed bars indicate normal operating speed and better quality. Four speed bars in back of the car indicate that the program is running at top speed, but only at normal quality. The program considers slightly less detail in its analysis of the image at the accelerated speed than it does at normal speed. The image quality difference is nominal.

Figure 18-20: You can see the Save and Load settings as well as Help. The four bars behind the car indicate that Acceleration is on.

Text output area

Located at the bottom of the SharpenerPro window is a box, shown in Figure 18-21, with four lines of text that describe various attributes of the image sharpening process.

✦ **Line One:** This line tells you the level of detail in the image as determined by SharpenerPro's Real Resolution Index on a scale of 1 to 600. The second half of the line reports the Sharpening Radius in pixels.

✦ **Line Two:** The program reports how the size and quality of the image will reproduce according to the parameters that you have set. SharpenerPro determines whether the image has enough detail to print optimally at the specified size. If the reading is 100%, then the image has optimal detail. Less than 100% indicates that there is more detail than necessary, and below 50% is a good reason to reduce the resolution of the image. Values over 100% show that there isn't enough detail to adequately print the image — in varying degrees. This line tells you in plain English whether you should proceed. Values between 50% and 250% are common and quite workable.

✦ **Line Three:** This line provides boilerplate information as to the image size in pixels, its color mode (RGB, CMYK), and the sharpening settings (Acceleration on or off; Autoscan on or off).

✦ **Line Four:** Other than low memory warnings, you may see three messages here:

• **No Warnings:** This is what you want to see. This means that the image is okay to sharpen and print, and everything is within parameters.

• **Warning: Please rescan this image!** This warning makes you sit up straight. The program has determined that there isn't enough resolution in pixels to get the desired print size, even though the slide or transparency has enough details. Rescanning at a higher resolution can save the day.

• **Warning: Image will appear blurry!** This message also wakes you up. In this situation, the program has determined that there just isn't enough detail in the image to print decently at the size you want. You may have a resolution of 300 dpi, but the details just aren't there. Rescaling the image may be your best course of action.

Real Resolution Index: —, sharpening radius = 0.076 = 0.8949 pixels
No printing information available without autoscan.
Size = 2100x1500 pixels, 300.68 dpi, color mode = CMYK, Acceleration: On
No Warnings.

Figure 18-21: The text output area provides valuable information about the document and how it will be printed.

nik SharpenerPro! workspace without Autoscan

In this section, I discuss the operational differences between using Autoscan or not. If you choose not to use Autoscan, you are provided with the two additional slider adjustments in the SharpenerPro window, as shown in Figure 18-22.

Figure 18-22: You input the Image Source and Quality in these sliders if you are sharpening the image without using Autoscan.

Image source

This slider is divided into ten options. The first four are APS, Small Format Slide, Middle Format Slide, and Large Transparency. These are conventional film formats. Casual photographers will probably use the first two, and professional photographers will use the entire range, depending on their equipment.

The next three settings are intended for digital cameras: Low End (under 1 million pixels), Mid Range (between 1 and 2 million pixels), and High End (greater than 2 million pixels). If your digital camera has a resolution greater than 4.2 million pixels, then you should choose the middle or large format settings to gain better results.

The last group of three options is intended for flatbed scanners. Again, Low End provides images that may not have a lot of contrast, or are soft scans. Middle Range flatbeds provide normal quality scans that are clear and have good contrast. The High End flatbed selection is for the higher quality or professional scans.

When you are planning to use SharpenerPro to sharpen your images after you have scanned them on a flatbed scanner, turn off the scanner's sharpening features. Failure to do so may result in an inaccurate sharpening of the image.

If your image is going straight to the Web, then you can choose the Internet/Autoscan option. The only options you can change are the degree of sharpness decreed by Anna, John, and Zap, as shown in Figure 18-23.
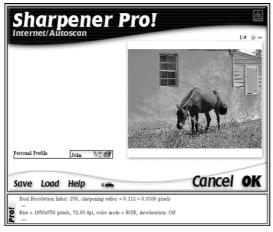
Figure 18-23: The Internet/Autoscan SharpenerPro window

Image quality

This setting requires you to be very objective and honest. You must decide the quality of the image: bad, below average, average, above average, or good. Just hoping that the image is good is not going to cut it! Keep in mind that you are helping the program to make the image sharp. You can't lie to it and get a good result. If you really can't decide on the quality issue, just leave it at the average setting. In that mode, this variable is unaffected.

Should you use Autoscan or sharpen the image yourself?

You should probably use Autoscan as a general rule. You still have control over the variable inputs and can make a lot of decisions about the ultimate output. Autoscan has the capability — or intelligence — to divine up to three scratches on an image. A fourth scratch tells Autoscan that these aren't scratches, they're part of the image. Therefore, if your dog got ahold of that 4 x 5 transparency, or if the JPEG that you're working with has been heavily compressed, you may be better off not using Autoscan.

How does Autoscan work?

Autoscan calculates the level of detail in the image by using algorithms that detect the "Real Resolution." Although every image differs in quality, pixel count, and image data, Autoscan calculates a value, usually from 90 to 250, that is then fed to the program. Based on this number, the program decides how much and how to sharpen the image. The results are shown in the workspace, and in plain language at the bottom of the plug-in window.

SharpenerPro also utilizes its own Fence 'n Foliage Protection. This attribute determines patterns in an image and sharpens accordingly. Details found in rocks, shrubs, lawns, trees, and so on will stand out if sharpened as much as the building that they surround. The sharpening causes lower saturation and reduces three-dimensionality by sharpening everything in the image equally. The program evaluates such areas, and sharpens these areas to a lesser degree, thus providing a more pleasing image. Fence 'n Foliage Protection goes a long way in reducing moirés as well by determining hard-line patterns and sharpening them less than other areas.

Optimizing file size with Genuine Fractals

When you take a photo with a digital camera or get an image on your computer with your scanner, you're stuck with the resolution, right? I mean, if it's 2 inches square at 72 dpi, you can change it to 300 dpi, but the picture will be ½-inch square. If you have to bring it up to 4 inches square, the photo will be at 36 dpi, and pretty much unusable.

If you don't have Genuine Fractals PrintPro 2.5, that's a correct assumption. With this program, however, size restrictions are a thing of the past! Now you can enlarge an image up to as much as 800 percent (while reducing file size more than 50 percent) and it will still be presentable.

For example, I scanned a photo of a carburetor and cleaned it up for dust and scratches. Then I adjusted the photo for contrast, brightness, and gamma by using the Levels command. I saved the Levels adjustment and then I saved the file as a TIFF, and saved it again as a Genuine Fractals PrintPro file. (The PrintPro file has a file extension of `.stn`.) I made a second scan of the same section at an enlargement of 400 percent, and I cleaned it up and adjusted it by loading the Levels adjustment that I saved earlier. I sharpened all the images by using nik SharpenPro when they were at the final size needed for printing.

Caution   Sharpening an image and then changing the image size up or down causes unsatisfactory results.

For a "real world" test of PrintPro, pretend that I'm your boss, and I've given you the original scan, as shown in Figure 18-24. However, I only want you to use a tiny section of the photo, and that section must be enlarged to 400 percent.
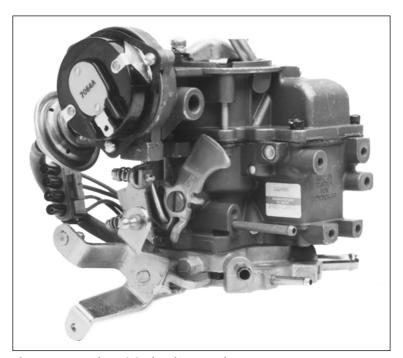
Figure 18-24: The original carburetor photo

If you had the original photo, you would be wise to rescan it at the correct enlargement, and make your adjustments and sharpening it to the size at which it will be reproduced. This sharpened image is shown on the left of Figure 18-25. Unfortunately (in this example), you don't have access to the original, and you must make do with the scan. On the right side of Figure 18-25, you see what the results will be if you simply enlarged the small area by 400 percent and sharpened it with SharpenPro.
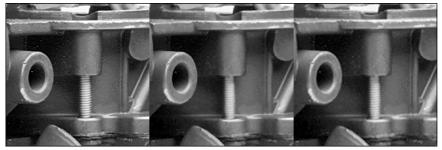
Figure 18-25: From left to right, the image scanned correctly, an image enlarged 400 percent from a PrintPro `.stn` file, and an image enlarged 400 percent using Image Size.

However, if you save the image in the PrintPro format and open it at 400 percent, and then sharpen it, you get what you see in the middle of Figure 18-25. Notice how the edges are sharper in the PrintPro version than in the enlarged image. When it's on-screen and viewed at a high magnification, you can see that the PrintPro version has an effect similar to the posterizing or pallet knife filters in Photoshop. — only the effect is in many tiny steps — the areas of change in color information only add to contrast and detail.

The process is either Lossless or Visually Lossless, as you choose. Lossless will produce a pixel-for-pixel reproduction of up to 2 to 4:1, and Visually Lossless saves the file at a ratio of 5 to 10:1 while still preserving the image quality. If you think that you may want to have extremely faithful reproduction when printing in the future, you should choose the Lossless encoding. Visually Lossless is fine for most Web work. For comparison, the full-size scan shown on the left in Figure 18-25 is 3.6MB, the `.stn` file is 144K, and the mechanically enlarged version weighs in at 420K.

What does PrintPro look like and how do you use it? The first step is to import an image in any of the usual methods — scanner, digital camera, original art, or imported graphic. Do all the image adjustment that you want, *except sharpening,* and then follow these steps:

1. **Go to File ➪ Save As.**

   The Genuine Fractals PrintPro Save As dialog box appears, as shown in Figure 18-26.

2. **You only have two choices. After you've made your selection, click OK.**

   The file on your monitor is now named with the `.stn` extension.

3. **Close the `.stn` file.**

4. **Open the `.stn` file that you just created (File ➪ Open).**
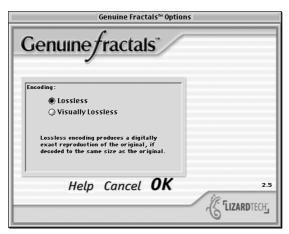
Figure 18-26: The Genuine Fractals PrintPro Save As dialog box

The dialog box shown in Figure 18-27 appears. As you can see, your image is on the right side. The left side of the window is divided into the following three sections:

- **Original:** This section lists the dimensions, resolution, and color space of the .stn file. It also tells you the full-blown image size, and the smaller, encoded file size. In the example shown in Figure 18-27, the original is 43MB, and the encoded size is 13MB — pretty significant, even for the Lossless method!

- **Crop:** This section shows the dimensions of the unmasked image area in the thumbnail on the right. Inputting numbers into these fields causes a red mask to cover areas of the photo that are cropped out when the file opens. Genuine Fractals came up with a nifty way of cropping the image manually. Click the mouse over an edge of the photo, and drag towards the center. A mask appears from one side of the image to the other, and may be repositioned. You can see that the photo shown in Figure 18-27 has been masked at the right and bottom.

- **Scale:** In this section, you can change print resolution, file size, dimensions, and color space. Depending on whether you've checked the option boxes, your dimensions and/or proportions may be constrained. You are presented with three levels of quality: Low, Good, and High.

You can opt to save the parameters that you've set in case you have more images of the same type to process.

5. Click OK.

The image opens in your photo-editing software. Because you've set the correct size and resolution, your last remaining step is to sharpen the image appropriately for its ultimate use.
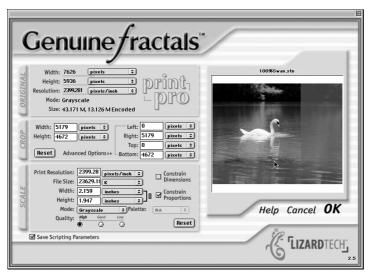
Figure 18-27: The Genuine Fractals PrintPro Open box has many features and attributes that you can set. A cropping mask is being applied to the right and bottom edges.

If your work goes on the Web, you may not think that you'd need a plug-in such as PrintPro, but look at the improved contrast of the photo shown on the left in Figure 18-28. I reduced the image on the right from the large original scan by using Image ⇨ Image Size, and then I saved it as a JPEG. I saved the original swan picture in the .stn format, and I opened it at the correct size and resolution for use on the Web. I also saved it as a JPEG by using the same compression as the original image. I then sharpened both images with the Internet/Autoscan option of nik SharpenPro. Notice the difference in contrast and sharpness in the PrintPro version.

Figure 18-28: On the right, a PrintPro image that has been cropped and resized shows greater contrast than the Photoshop version that has only been resized with Image Size.

A better view of what happened in this image is shown in Figure 18-29. These images have been enlarged approximately 400 percent, so you can see how the images differ.

Figure 18-29: This comparison is an enlargement of the images shown in Figure 18-28. Notice the difference in contrast and sharpness, even though both images were sharpened at the same time.

Summary

This chapter delved into the vagaries of fine-tuning your system and keeping each of the devices speaking the same language through color management. I showed you that by optimizing your setup with a calibrated monitor, scanner, and printer, and then using or creating correct and current profiles for each of the devices, you can be assured that what you see really is what you get. Then I explored the fine art of image sharpening using nik SharpenPro so your images will be crisp and clear when they're viewed. Finally, I looked at a great little plug-in that allows you to save disk space by compressing images, and being able to enlarge them beyond what is normally possible by using Genuine Fractals PrintPro.

✦   ✦   ✦

Specialty Output Options

I n my opinion, there are three major joys in photography. First, there's the rush you get while you're setting up for the shot, which includes getting the composition just right, checking the lighting, the people or props, the background, and making sure that everything is just perfect. Then you click the shutter and the moment is gone. The second thrill is viewing or printing the image. Seeing the image on the LCD display on your digital camera, or even on your monitor, just doesn't cut it; however projecting a slide or making an enlargement — those are the big moments that photographers look forward to. Finally, there's the look of approval from someone else viewing your work for the first time. That has to be one of the biggest kicks you can get out of your photography, whether it's a hobby or an occupation. This chapter deals with getting really big enlargements for really big kicks.

Choosing, Using, and Hiring a Large-format Printer

If you are a professional photographer or artist and your work involves large-scale prints on a regular basis, then you may be thinking about purchasing a large-format printer. The term *large-format* refers to printers that produce output larger than 11" by 17". These printers usually print from rolls of substrate, although some printers are sheet fed. The rolls run up to about 150 feet long and are between 2 to 10 feet wide. Some printers can output a single image the full width and length of the roll, in one session. You probably wouldn't want to be the person writing the check for that print, though.

If you do film processing in a custom photography lab or a commercial printing plant, you may be interested in purchasing a large-format printer. Images from different sources can be gathered together (ganged up) and printed all at once, which can save you quite a bit of time and energy. It's also

more efficient and cost-effective to gang jobs, and you can pass the savings along to the customer, or to your bottom line, depending on your situation.

Owning a large-format printer has drawbacks too:

✦ **Cost:** Unless you do a huge amount of business with the printer, the cost will be prohibitive. Large-format printers start at around $3,000, and go up to $225,000.

✦ **Space:** These printers live up to their *large-format* name. It stands to reason that if a printer can run a nine-foot wide roll of paper it has to have a little space around it for maintenance as well as day-to-day operation. Some printers have a relatively small footprint that's just a foot or two wider than the media, and maybe two feet deep. Others are much bigger than a breadbox, with dimensions nearing the size of a dumpster.

With that in mind, you may just want to purchase photographic enlargements as you need them. You won't have the monthly lease payment, the maintenance contract, the cost of materials, and the disadvantage of the learning curve associated with the new equipment. Instead, you can go to people who have a handle on their market and can give you professional results every time. If a print goes bad, they redo it at no cost to you before you even see the mistake. They'll probably have different types of substrates as well, which can range from matte, gloss, and laminated stocks, to film and various textures such as canvas or linen. Maintaining an inventory of several substrates could be a costly investment unless you can effectively market their use.

Keep a few things in mind when hiring out your large-format print jobs:

✦ **Control:** You do lose total control of the situation, but if you've chosen the vendor carefully, your mind should be at ease.

✦ **Cost:** You need to investigate the costs of the service. As in most everything, you get what you pay for, so don't use price as your sole determining factor when you're choosing a vendor. You'll be spending $10 to $50 per square foot for your print.

✦ **Quality:** Ask to see a sample print. Any good vendor will send you a piece of a larger image that you can examine for detail, grain, sharpness, and type of media.

✦ **Timing:** Can the vendor produce the print within your timeframe, or will you find yourself making excuses to a client? Will costly rush fees be involved? Can you wait a few days until your job can be run with others?

Tip   Most vendors will have the ability to mount the resulting print on various rigid or semi-rigid substrates such as foam board, Masonite, wood, or chipboards. If you've ever tried to mount a photo larger than 11" x 14" without the proper equipment, you know how troublesome the process can be. Think of the nightmare of mounting a print that's six feet wide!

Creating Output for Exhibition

There are several factors that you must consider when creating a large image for exhibition:

✦ **Environment:** First and foremost in your mind should be whether the print will be used outdoors or indoors. While some inks have longevity measured in hundreds of years, placing that ink in an environment subject to sunlight, moisture, and temperature extremes could drastically reduce the lifetime of the image. You should talk with the person who will be creating the large format print for you, and find out the best possible combination of ink, substrate, and type of printer. Hopefully, there is enough information in this chapter to help you make an educated decision.

✦ **Ink type:** Many factors influence the longevity of inks, chiefly, their exposure to the elements — sun, moisture, abrasion, but also the chemical makeup of the inks themselves:

- **Solvent-based pigments:** Some inks are formulated with solvent-based pigments. Usually solvent-based inks are hardier in extreme conditions, but most people will put a clear laminate over the printed piece for added protection and ultimate longevity. Solvent-based inks have a good color gamut, but their main selling point is excellent outdoor resistance to fading for a period of two to four years.

- **Water-based vegetable dye:** This is the most common type of ink used in most inkjet printers. The color gamut of dye-based inks is slightly larger than solvent-based inks. The colors are lush and intense, and produce stunning output, but they're usually used for proofing and indoor posters. Longevity is somewhat shorter than solvent-based inks, but still in terms of years — some printer manufacturers claim up to a hundred years — depending on conditions. By and large, dye-based inks are cheaper than solvent-based inks.

- **Screen printing inks:** Some wide-format printers utilize screen printing inks instead of other solvent-based inks or vegetable dies. These inks are developed for long-term use, and extremely resistant to weather and sun exposure.

✦ **Printer type:** Printer technology roughly determines the use of the printed page. Each type of printer produces a different result, but the end-use of the prints is not cut and dried. A continuous tone print, laser print, inkjet print, or dye-sub can all be the desired print, depending on budget, objective of the project, and environmental concerns:

- **Continuous tone printers:** Continuous tone printers produce photographic prints similar to what you can get from a contemporary film-based enlargement. You can expect the same life from a continuous tone print as you would a traditional film-based enlargement under the same environmental conditions.

- **Laser printers:** These printers are much lower in price than continuous tone printers. High-resolution color laser printers place 1,200 dots of toner per inch or more. Higher resolutions produce output that is nearly continuous tone quality. The toner dots lie on the surface of the paper and are crisp and sharp.

- **Inkjet printers**: These printers are usually less expensive than lasers, but their output belies their low cost. The ink is wet, and soaks into the paper, causing a blending that makes individual dots of ink hard to see. Special coatings are applied to inkjet papers to control the amount of absorption and spread of the ink. Prints from high-end inkjet printers look just like continuous tone photographic prints.

- **Dye-sub printers:** This type of printer works much like an inkjet printer. The die is in solid form that is heated to convert it to a gas state. A coating on the substrate causes the gas to solidify on the substrate.

The term *wide-format printers* usually refers to a device that prints a sheet of paper that can be described in terms of feet-wide instead of inches-wide. For the purpose of this chapter, however, I will start the discussion at tabloid size, or 11" x 17" and go up from there.

As touched on earlier, the prices of printers go up with the size of the output. But within the tabloid-sized printer market, there are quite a few exceptions due to variances in technology. Each of the technologies produced by different printer manufacturers are covered later in this chapter.

Understanding the Print Process

All printers — laser, inkjet, continuous tone, dye-sub — must somehow transform data from the computer source into data that can in turn be transmitted to a means of causing the image to appear and remain on a substrate:

✦ **Spooling:** After you click the Print button, your image data is first sent to the computer's operating system's built-in spooler, which usually uses virtual memory. The data then gets transferred to the printer, or *spooled.* The transfer begins at the I/O buffer, which may be from the parallel port, serial port, USB port, or Ethernet port on your computer.

✦ **Spool buffer:** Next, the data passes to the printer in a temporary RAM or hard drive storage area called the *spool buffer,* where it waits for the entire page to be gathered. Some printers are capable of receiving files from multiple sources at the same time, which keeps the file on a hard drive until it's time to print. Most printers, however, have hot-port interfacing, and can only deal with one computer's input at a time.

✦ **Emulation:** Data from the spool buffer is then examined by the printer's software to decide how the print job is going to be processed. The first part of a print file contains specific emulation recognition codes for PostScript, PCL,

GL, and so on. The printer then searches its system for the correct printer emulation. If this doesn't happen automatically on a particular printer, then the choice must be made at the printer's console each time a job is printed.

✦ **Display list:** After the printer emulation is decided, the print data is interpreted and compressed so it can be stored in the *display list* on most printers. The display list groups sections of the page in packages that stay in the display list until the job is completely printed. The purpose is that if the printer jams, it can reprint the page or pages after the jam is cleared without making you start the whole process over. Because the display list contains the entire print job, you can print multiple copies of a collated job without resending the print job.

✦ **Rasterization:** After data is stored in the display list, printing technologies tend to veer off in their own directions, but the process is basically the same. The image must be *rasterized:*

- The display list provides the compressed data packages for a given page, and passes that data through the *rasterizer.*

- The rasterizer translates the data into a bitmap version of the image or text on a page, and stores it in the frame buffer.

- Finally, the frame buffer sends the data to the print engine where the image is turned into impulses that beam, blast, spray, splatter, or otherwise pass the bitmap to the substrate. The differences are covered in the printer-type sections coming up later in this chapter.

Laser printer mechanics

A black and white laser printer has an imaging process that's fairly straightforward. The laser printer contains a highly-polished aluminum cylinder coated with a photosensitive material and in order to receive a page for printing:

1. The cylinder/drum is cleaned with a rubber blade that wipes excess toner off the drum, just like a windshield wiper on your car. Then the drum is "erased" by a lamp or an electrostatic charge that removes any trace of a previous image.

2. The drum is conditioned to receive the image by receiving a charge of −600 volts.

Note You've no doubt changed a corona wire during routine laser printer maintenance. The primary corona does the charging in some printers; others have a charged drum. Several other corona wires are also involved in a color laser printer.

The negative charge spreads evenly across the drum, and a laser begins hitting the drum wherever parts of your image are to appear.

The laser gives certain areas a negative charge of around −100 volts. Wherever the charge is reduced, or neutralized, toner adheres a few seconds later in the process. Early laser printers had 100 dpi resolution, which means the laser

made 100 passes per inch across the drum. The results were great for the time, but today, a 300 dpi or 600 dpi is considered standard, and it's not uncommon to see laser printers with 1,200 dpi.

3. The drum turns around and charges in some places at –600 volts and less in other places.

4. The laser stops beaming, and the paper starts its path from the paper tray at the same time the toner cartridge comes into action.

    The toner cartridge contains a rotating, magnetic cylinder; a toner reservoir; and a mechanism that determines how much toner can be applied at a time. Toner is made up of two components:

    - **Plastic resin particles:** These particles will eventually melt into the paper making the image.

    - **Iron oxide (magnetic) particles:** These particles are acted upon by magnetic and electronic charges and cause the eventual transfer of the toner to the drum.

5. The toner's metal particles attract magnetically to the walls of the toner cylinder. As the cylinder charges to the same –600 volts as the drum, the toner takes on the same charge.

6. The drum passes by the cylinder, and the toner attracts to the lesser-charged areas on the drum — opposites attract, remember? The areas where the charge is the same are left blank. The toner jumps off of the cylinder and onto the drum.

7. The paper receives a *positive* charge of 600 volts as it makes contact with the drum.

    As the paper passes the drum, the same type of positive/negative process occurs, but the toner jumps from the drum onto the paper.

8. The electric charge on the paper passes over a static charge eliminator and becomes neutralized.

    Now the toner is lying on the paper. A good breeze would blow it all away, but the slight electrostatic charge keeps it in place.

9. The paper goes through the fusing process.

    A *fuser* is a cylinder that heats paper up to between 330°F and 350°F.

10. The plastic toner particles melt and fuse with the fibers that make up the paper.

11. A pressure roller presses the still-warm toner into the paper for better adhesion.

Caution   Be aware that you can't run inkjet transparency film through a laser printer. The fuser melts the film, causing you time and money, and the entire fuser assembly must be replaced.

That's the way a black and white laser printer works. Bringing color into the picture, changes things slightly. Single-pass printers have four toner cartridges lined up closely together. A separate laser for each color beams light at rapidly spinning mirrors that scan the photosensitive drums and change the charge on the drum to positive, which causes it to attract the toner. As the drums turn, an intermediate transfer belt passes in front of them to collect the charged cyan, magenta, yellow, and black toner particles in turn. The belt then transfers the perfectly registered toners to the paper. The paper and toner are then fused with heat and pressure.

LED color printer mechanics

Single-pass LED color printers work in a similar fashion to a color laser printer, but there are two main differences:

✦ **The manner of charging the photosensitive drums:** Whereas a laser printer scans the surface of the drum with tiny beams of light that zip from side to side, the LED printer has an array of 7,500 light-emitting diodes in a single file that spans the width of the drum. The LEDs are just slightly above the drum's surface, and the printer causes each LED to flash where a part of the image is to appear. The voltage to the LED causes it to flash dimly or brightly creating respectively smaller or larger dots on the charged drums. If a particular LED doesn't flash, then there will be no toner applied to that area on the paper.

✦ **The placement of toner on the paper:** The drum rotates past the LED printbar, and then it receives the toner as in a laser printer. But instead of the toner being passed to a charged belt, the paper itself travels beneath the charged toner drums, and the toner jumps onto the paper. Again, the paper and toner pass through a heat and pressure fusing process.

Inkjet color printer mechanics

Unlike laser and LED printers, an inkjet printer uses a completely different technology to apply color to paper in a very photographic way. The concept of an inkjet printer is to spray or squirt ink on the paper in measured amounts. Inkjets run the gamut of prices these days. Some models are given away with new computer or scanner purchases. Others require a small mortgage.

Inkjets from Epson use piezoelectric crystals that flex when an electric current is applied to them. These crystals sit in the back of a printhead that contains a tiny reservoir of ink. When the crystal flexes, it forces a commensurate amount of ink out of a small nozzle onto the paper. The amount of voltage arriving at the crystal determines how much the crystal will flex. Therefore how much ink transfers to paper (the size of the dot) depends on the amount of voltage. Epson printheads are classified as extremely accurate and reliable, and are used by many manufacturers in very high-end printers.

Bubblejet printers are thermal inkjet printers that heat the ink to 572°F (300°C). At this temperature, the ink boils and forms a bubble that expands under pressure and

bursts. Then the heater switches off and more ink is drawn into the nozzle for the next cycle. The popping bubble spatters ink droplets onto the paper through nozzles that are thinner than a human hair. Newer printheads on Canon printers contain hundreds of nozzles that spray ink out at a rate of thousands of times per second. These printheads utilize a pair of heater elements on each nozzle that can create a larger variety of dot size. If both of the heaters are on, the droplets will be larger than if only one heater is on. The ink in some bubblejet printers is a formula of vegetable dyes and alcohol, other manufacturers use pigment-based inks.

Large-Format Laser Printers

A large-format laser printer usually creates prints not more than 11" x 17", although there are a few that will print 13" x 35". Most of these printers are geared for business use, with a tendency toward the advertising agency and design shop crowd. Prices range from just under a thousand dollars to around $10,000.

Large-format laser printers are built with speed, not necessarily museum-quality printing, in mind. As with any piece of equipment, quality varies, but some models produce extremely high-quality output, nearing exhibit quality. Those prints are very good, but wouldn't demand the same price as a print from a high-end inkjet or continuous tone printer. Due to the manner in which the laser applies the image to the stock, the substrate is usually restricted from thin paper to thick index card stock.

Xerox

Xerox has become the word for "copy." Of course, a "Xerox copy" only applies to copies printed by machines bearing the Xerox name. But it's obvious that the company must have done something right to obtain such stature that its name has become a verb. The company wasn't content to rest on its laurels, though. Xerox now produces some very fine printers that provide reliable high-quality output. Xerox printers can be explored in more detail at `www.xerox.com`.

Xerox DocuColor 2006 printer/copier

The Xerox DocuColor 2006 prints up to 13" x 18" with a resolution of 600 x 600 dpi. Its 8-bit color depth provides an image that is almost continuous tone in quality, and supports ICC and ICM color press profiles. Xerox has created a new toner formulation and fusing process to create a sharper image — the detail it reproduces is absolutely stunning. Interestingly it can print in RGB, CMYK, Pantone(r) workflows, and it can print PDF documents directly. Ad agencies love the fact that it also does duplex printing (printing on both sides of the sheet) that are perfect for comprehensive layout presentations. The DocuColor 2006, which is shown in Figure 19-1 and retails for $14,999, has the following features:

✦ 1,400-sheet paper capacity

✦ Prints up to 99 copies per job

✦ A ten-bin sorter

✦ Prints 6 color pages a minute

✦ Prints 26 black and white pages a minute

✦ Network-ready with 10/100 Base-T Ethernet and parallel connectivity

✦ A 6GB hard drive

✦ 64MB RAM (expandable to 512MB)

Figure 19-1: A top-of-the-line Xerox DocuColor 2006 laser printer

Xerox Phaser 7700 color printer

The Xerox Phaser 7700, a single-pass laser printer, was built for the graphic arts field. You can expect a retail price of $6,999 for the Phaser 7700, which is shown in Figure 19-2 and has the following features:

✦ Network-ready

✦ Produces 1,200 dpi resolution color or black and white

✦ Prints at a rate of 22 pages a minute

✦ sRGB color matching

✦ ICC and ICM support

✦ TekColor Dynamic Color Correction

✦ ColorSync

✦ Adobe PostScript Level 3

✦ Pantone-certified

✦ Accommodates paper sizes from 4" x 6" up to 12" x 18"

✦ Can print on both sides

✦ Handles paper stock from 16 lb. to 110 lb. index

✦ G4 500 MHz processor

✦ 10/100 Base-T Ethernet

✦ 128MB of RAM (expandable to 512MB)

✦ 5GB hard drive

Figure 19-2: The versatile Xerox Phaser 7700 color laser printer

Xerox Phaser 2135 color printer

The Phaser 2135, shown in Figure 19-3, is another fast mover. This single-pass printer retails for $4,699 and has the following features:

- ✦ Prints 21 pages per minute in color and 26 pages per minute in black and white

- ✦ Transfers a full color image to paper in a single pass using LEDs

- ✦ 500 MHz Intel processor that can produce a color first-page-out in 17 seconds and a black and white first-page-out in 13 seconds

- ✦ 1,200 dpi resolution

- ✦ Prints both sides of the sheet, making it ideal for proofing and booklet printing

- ✦ Network ready with 10/100 Base-T Ethernet

- ✦ A 5GB hard drive

- ✦ 128MB of RAM (expandable to 512MB)

Figure 19-3: Xerox 2135 single-pass color laser printer

Inkjet and Dye-Sublimation Printers

When I saw my first inkjet prints at a friend's shop a few years ago, I looked at them with the same smug thoughts I had about early instant-print photos. The images lacked sharpness, the colors were dull, and the paper was wimpy. Early inkjets lacked sufficient resolution, and my friend was not using inkjet papers or properly prepared his images for printing. But, times have changed, my friend and I have changed our ways, and inkjets put out some very classy work these days. I can still get garbage out of my printers, but I have to work hard to do it!

The discussion of inkjets begins at the lower end of the price scale, and you can get very acceptable, high quality images from a less expensive printer. Of course, as the price goes up, so does the precision and reliability of the printer. However, there will probably be a fairly hefty service or maintenance agreement with the higher priced printers.

If you're looking for true photo reproduction just shy of the photographic process, dye sublimation (dye-sub) is what you're looking for. It utilizes a technique that is unique in the printing world. In the dye-sub process, ink is converted from a solid form into a gas without going through a liquid phase. In order to accomplish that, the substrate is usually coated with a chemical that bonds with the gas. The dye then becomes part of that coating. A dye-sub printer has a ribbon or plastic sheet that contain the various ink colors. As the sheet passes over the coated paper, thousands of heating elements in the printheads superheat the inks, one color at a time. The inks are instantly vaporized and bond with the coated paper. Then the next color is vaporized and bonded. There are no dots or discernable patterns in dye-sub printing, and the results are very close to photographic prints. Each heating element in the printhead can produce 256 temperatures — the hotter the temperature, the more die gets vaporized, and thus the stronger or more intense the color will be.

Giclée Fine Art Prints

Before getting into various printer specifications, I must discuss a type of printing that you may not have heard about until now. It is called giclée (ghee-*clay*) and is the cream of the inkjet crop. Just as you may refer to "Greenery Maintenance Professionals" instead of "the guys mowing the lawn," the term "Giclée" was introduced to describe (in French) the spraying process of the inkjet Iris printer.

In the early 1990s, the Iris inkjet printer was the top-of-the-line digital proofing printer for the graphic arts market. At about that time, rock star Graham Nash and his friend Mac Holbert discovered a new use for the Iris — they started printing fine art on it. This was due largely to the high-quality, super fidelity of the prints the Iris could produce.

Now, you may well ask, why would you want a giclée print? What could it possibly mean for you? Well, consider that you have an image that is very wallable and saleable, too. You could go to your favorite offset printer and have them print a few hundred 24" x 30" prints at a cost of several hundred dollars out of pocket. Then you could keep those prints in a box in a cool, dry storage area until you sell each print. Slowly but surely, you'd probably make your money back and possibly turn a profit.

Then again, maybe you wouldn't. Possibly that print that everyone seems to love just isn't something that anyone wants to pay for. Now you're stuck with all those prints, and you can't afford to buy the latest Photoshop upgrade.

Instead of choosing this potentially risky route, you could show the prints on the Web, take orders, and as the orders come in, you take your *digital* image to a giclée fine art printer and have single prints run off at a very reasonable price. There's no large up-front cost that

you would incur with offset printing, and each print looks as great as the last one. You also don't have any storage problems or have your capital tied up in merchandise that may or may not be sold in a timely manner.

The nicest feature is that the quality is much better than traditional offset printing. Today's giclée printers have such high resolution that it's virtually impossible to see any kind of dot without a loupe. Most of the printer manufacturers use technology that allows you to enlarge your image far beyond what you thought was possible, and you'll still have a sharp photo. The inks are usually solvent-based or pigment-based, so the life of the print is around a hundred years or more.

Note: Don't forget the old garbage-in, garbage-out process. Just printing a digital image four feet square will not make that image any sharper or better than it was when you took the photo. If there's something objectionable in your image, those objections are only going to be exaggerated when the photo is enlarged.

A few giclée groups each claim to do the best work, and there really aren't any hard and fast guidelines to the process. So, what can you expect from a giclée printer? For one, you'll probably find them on the Web, and that means you can transfer your file to them electronically via e-mail, but it is best to send a CD through the mail along with a print from your system that you consider acceptable. The printer will create a pair of smaller prints for you — say 8" x 10" — for you to approve. If you like the prints, you send one back with your signature as approval. You keep the other print to compare with the final output.

A few days later, your enlargement will arrive, you hang it or sell it, and start looking for the next image you want done. Some dealers will have a small "archival" fee; others will keep your image on file for future orders. It's a good idea to get that information straightened out before committing to the dealer.

Some dealers will also offer to sell your work on their Internet site or in their gallery. Commissions and fees vary from dealer to dealer. Your print can be produced on several types of stock, including watercolor paper, canvas-textured board, hot-pressed boards, and backlit films. Giclée printers are usually equipped to mount your print on various substrates, too, if you want a rigid print.

For the crème de la crème of Giclée, you will want to go to `www.trugiclee.org`. This group of professional fine art printers (the Giclée Printer Association, or GPA) has banded together in the interest of providing the highest quality of short run printing possible. I don't think they have a secret handshake or anything, but they did arrive at what they call the "9 principles of GPA" that they live by, which you can examine on the site.

Epson

Epson manufactures printers to satisfy just about any price range or image quality you desire. The printers described here are only a few of those available at press time. The Epson Web site (`www.epson.com`) allows you to compare the latest printers side-by-side.

Epson Stylus Photo 1280

The Epson Stylus Photo 1280 printer uses six colors with a Micro Piezo inkjet technology to produce very impressive prints. Its finest resolution is 2880 x 720 dpi, but can be run in a "draft" mode of 180 x 180 dpi. The 1280, as seen in Figure 19-4, handles a large array of paper stocks from plain bond through premium glossy photo paper, glossy film, self-adhesive sheets, cards, iron-on transfer paper, and roll papers. Stock size runs from 4" x 6" up to 11" x 17" and 13" x 19" (Super B). Epson says this $499 printer will print a sheet 13" x 44"! The inks that run in the 1280 are rated to be lightfast for about 25 years in normal indoor display conditions in a glass frame and Epson Matte Heavyweight Paper. Using standard Epson Photo Paper yields a 6 to 7 year lifespan. The black head and color head both contain 48 nozzles.

Figure 19-4: The extremely capable Epson Stylus Photo 1280 desktop inkjet printer

Epson Stylus Photo 2000P

Just as in the Epson 1280, the 2000P (shown in Figure 19-5) uses six colors with the Micro Piezo inkjet technology. Both printers have separate black ink cartridges. At $899, this printer produces 1,440 x 720 dpi in color or black and white and uses Epson Archival Ink. This type of ink is rated for lightfastness at 200 years or more before noticeable fading occurs on Epson matte paper in normal indoor fluorescent lighting under a glass frame. Epson Premium papers have a slightly shorter lifetime of 140 years. The 2000P prints papers from letter size up to the same 13" x 44" maximum size of the 1280.

Figure 19-5: Archival inks in the Epson Stylus Photo 2000P will last upwards of 200 years.

Epson Stylus Color 3000

The Epson Stylus Color 3000 is another Micro Piezo inkjet technology printer, but it uses 4-color CMYK inks in a color cartridge and separate black cartridge. The main difference between this $995 printer and the two others described previously is that the 3000 comes with PostScript 2 installed. The 1280 and 2000P require you to purchase Epson Stylus RIP (about $149) in order to print PostScript jobs. The 3000, shown in Figure 19-6, has a live print area of 16.12" x 21.31" but can print anything from 4" x 4" to 17" x 22". The black head contains 128 nozzles, and the color head has 64, to produce 1440 x 720 dpi.

Figure 19-6: You can print 17" x 22" sheets on the Epson Stylus Color 3000.

Epson Stylus Professional 10000

On the upper end of the scale, you find this 44"-wide printer (seen in Figure 19-7) that has an output of 1,440 x 720 dpi at a maximum speed of 231 square feet per hour. It utilizes Archival inks, and connects to the computer by Firewire, USB 1.1, or

Parallel (IEEEE-1284 ECP mode). Ethernet 10/100BaseT is available as an option. You can choose from several types of papers available to match any needs you or your customers may require. To give you an idea of what consumables cost for a printer this big, a box of 20 sheets of smooth fine art paper at 24" x 30" costs around $185 — that's $9.25 a sheet. A box of 10 sheets of the same paper at 36" x 44" costs $20 a sheet. A 44" x 65' roll of glossy photo weight paper costs $240, which is only a few cents more per square foot than the sheet stock. A roll of 44" x 100' back-light film costs $260. The Epson Stylus Professional 10000 costs, well $10,000, minus about $5. If you want an extended warranty, one year costs $1,199, and two additional years runs $2,199.

Figure 19-7: The Epson Stylus Professional 10000 is a true large-format printer.

Roland

The high-end printers from Roland are the Hi-Fi Jet Pros. All three models feature a dual-head variably droplet technology with 8-color printing. Eight different inks mean several things for a Jet Pro owner. For one, you can have a set of CMYK pigmented inks and a set of dye-based CMYK inks on the printer at the same time. With that setup, you can switch from one type of ink and substrate to another while the customer is waiting in the lobby — very quick and versatile changeover. Pigmented inks could be used to produce an outside poster, and the job could be run again with dye-based inks for indoor display. The dual heads really shine when CMYK inks are matched with orange, green, light cyan, and light magenta to transcend normal 4 and 6-color printing to a new, higher, level of photorealism. The Roland Hi-Fi Jet series is the world's first and only 1,440 dpi large-format inkjet printer that's capable of outputting the Pantone(r) Hexachrome system.

Roland utilizes variable droplet control, with nine ultra-precise sizes of perfectly round ink dots that provide silky-smooth, grain-free prints that rival continuous tone. The printheads have 96 nozzles per color, and produce 1,440 x 1,440 dpi with built-in ICC color profiles that are precise enough for digital proofing. All three printers come with a RIP, and are PostScript 3 endowed. The smallest Hi-Fi Jet Pro is the FJ-400, which sells for around $17,000 and prints a 44"-wide roll. The FJ-500 sells for $19,000 and uses a 54" roll. You can print a 64"-wide roll on the $21,000 FJ-

600, seen in Figure 19-8. All three can print to within a quarter-inch of each side of the paper.

Figure 19-8: The Hi-Fi FJ-600 from Roland prints a 64"-wide roll up to 150' long.

You can find Roland printers installed in "print for pay shops" where serious photographers and artists pay from $50 up for a four-foot square print. You can get more information on Roland printers of various sizes and capabilities at `www.rolanddg.com`.

Iris

The Iris printer, from Creo, has long been considered the top of the line when it comes to digital proofing. These printers are installed in service bureaus and commercial photo labs all around the world. A word of caution here: If you go looking to get a fine art print produced at a service bureau or commercial printing plant, you may be a little disappointed in the results. A printer or a proofing system is set up specifically for offset printing, and probably a particular press setup. The results will certainly not be bad, but you will probably be happier by going to one of the fine arts printers and paying the price ($50 to $100 per print) to have them do the job in an arty fashion. There are more than 200 fine art and photography printers in the United States that have specific ink and media combinations, plus the professional attitude you're looking for.

Iris iPROOF printer

This desktop printer — well, it's gotta be a big desktop — is the most common digital proofer seen in service bureaus. Creative and prepress professionals know they can count on predictable color throughput from one job to the next. Iris Graphics has been around long enough in the graphic arts industry that it's acquired the color tools, imaging technology, and optimized ink/substrate combinations for optimal image quality — it's basically the industry standard. The iPROOF lives up to

that standard, and uses IrisSCREEN technology that simulates the Iris continuous inkjet technology used in the higher-end models. An Iris iPROOF, as shown in Figure 19-9, costs about $4995, and includes Mac-based PS Level 3 RIP (raster imaging processor).

Figure 19-9: The desktop Iris iPROOF next to an Apple iMac

Iris2PRINT and Iris4PRINT printers

Most inkjet printers utilize what is called a *drop on demand* (DOD) print process. Iris chose another path for the Iris2PRINT and Iris4PRINT models. They developed a *continuous inkjet* (CIJ) technology, and the difference in operation is awesome. A DOD system applies dots of ink to the paper only as required. Most DOD printers apply a fixed-size dot of ink measured in picoliters (pL). A picoliter is the volume of one-trillionth of a liter. The average dot size on inkjet printers is between 5 and 7 pL. Some DOD printers are referred to as having variable dot resolution. That means that there may be as many as nine sizes of dots or ink droplets that are passed from the printhead to the substrate, depending on instructions from the print spooler. If an area of the page doesn't require a particular color from the print-head, nothing is emitted, and the paper stays void of color in that spot. On the other hand, a CIJ printer sprays ink from the time paper starts to pass through it until the sheet is done. Sounds messy, right?

To make it sound even messier, Iris printheads apply one million drops of ink per second per color, and the drops are scaled from one to 31 droplets in the space of a 300 dpi dot. So where does all this ink that's splattering around go? Well, by giving a charge to the ink droplets that are not needed on the paper, Iris places a deflection structure close to the printhead. This element has the same charge as the ink, therefore it deflects the ink so that it can be drained away. Ink drops that do not have a charge are attracted to the paper. The paper is attached to a cylinder during the printing process. By the way, these ink drops are only 3 pL in size — very small.

As for the wasted ink, the price of ink is negligible, and the inks are biodegradable vegetable-based dyes that can be discarded without endangering the ecosystem or worrying if the sewer will explode.

The Iris2PRINT, as shown in Figure 19-10, takes a 13" x 19" sheet and sells for $35,000. If you have an extra five thousand dollars ($40,000), you can get the Iris4PRINT and print 24" x 30" sheets. Registration on both machines is such that you can leave a printed sheet on the cylinder and reprint the job — dots of ink will land in the exact same spot as in the first run through the printer. That's my kind of registration!

Figure 19-10: The Iris2PRINT and Iris4PRINT continuous inkjet printers
Courtesy of Creo, Inc.

You can learn more about Iris printers at www.creo.com.

Hewlett-Packard

Hewlett-Packard probably can't be beat for the number of different printers it manufactures for different markets and size of output. Products range from black and white or color plotters to inkjet, laser, and dye-sublimation printers. Just like other manufacturers, the people at HP have designed substrates and inks to meet every need. Most of its large-format printers are built for high-volume shops with reliability in mind — a high degree of unattended printing is expected.

HP Designjet 500 and HP Designjet 500ps
These two large-format printers come in 24" and 42" models shown in Figure 19-11. The basic difference between them is that a PostScript 3 RIP and a lot of color man-

agement support come with the 500ps. That model also is Pantone(r) certified. What they share is CMYK thermal inkjet printing 1,200 x 600 dpi on a variety of media. Designjet 500 printers are usually found in the offices of architects, advertising agencies, designers, and graphic artists. Prices range from $2,149 for the 24" Designjet 500 up to $3,798 for the 42" Designjet 500ps. Both printers come with 16MB of RAM, and can print color images at a rate of 85 square feet per hour in the fast mode. That speed isn't the feature you'd want to use for a print you're going to sell as artwork, but it would serve you well for presentation graphics. Best quality results print at 21 square feet per hour. Oh, you'll need a 500ps model if you're running a Mac—the 500 model is only good for Windows machines. But you can connect the printer via Centronics parallel, IEEE 1284-compliant (ECP), and USB.

Figure 19-11: HP Designjet 500 printers can produce images on 24″ or 42″ rolls.
Courtesy of Hewlett-Packard Company

HP Designjet 800 and HP Designjet 800ps

The 800 series printers, shown in Figure 19-12, differ slightly from the 500 series in that they come with much more RAM. The non-PostScript version has 96MB, and the 800ps has 160MB. The extra RAM helps the "virtual computer" in the box to process files without tying up the source computer. They also support queuing, nesting, and processing the next job while the first one is still printing. If you're on a network, you can choose from Centronics parallel, IEEE 1284-compliant (ECP), USB, and 10/100BaseTX Ethernet. Print speed is the same for these printers as the 500 models. The price for a 24" Designjet 800 is $4,995, and a 42" Designjet 800ps runs at $7,772.

Figure 19-12: The HP Designjet 800 series and 500 series differ in the amount of RAM and their processing hardware.
Courtesy of Hewlett-Packard Company

The huge array of Hewlett-Packard printers can be explored at `www.hp.com`.

Canon S9000 Photo Printer

Canon also makes a wide variety of printers. The S9000 is billed by Canon as "the professional photo lab for your desktop." It's one of the smaller large-format printers, printing from 4" x 6" paper up to 13" x 19". The S9000, seen in Figure 19-13, features 3,072 inkjet nozzles for faster printing with greater detail. With a combination of ink-droplet size, accurate ink application, consistent droplet quality, and ink composition, you get 2,400 x 1,200 dpi print resolution with 49 gradation levels. All that amounts to breathtaking detail, beautiful color reproduction, and reduced graininess.

The S9000 uses six individual ink tanks for the most accurate color matching possible. Low-ink sensors warn you with an on-screen message when an ink tank is low, giving you plenty of time to replace the tank before you actually run out of ink— and the prints are lightfast for 25 years. You can find dealer information at `www.canon.com`.

Figure 19-13: The professional photo lab for your desktop —
the S9000 from Canon

Digital Continuous Tone Printers

If you are serious about your trade, sooner or later you'll find yourself getting digital continuous tone prints. It sounds like a contradiction in terms — digital and continuous tone — but these printers use a traditional photographic substrate, such as C-print papers, negative film, transparency film, or "Duratrans" backlight film.

Continuous tone images can be produced on a substrate in different ways, but the process is similar in many ways to conventional photographic processing. In one manner or another, the media is exposed to RGB light, just as you would require in a C-print from a film negative. The media is then developed, dried, and comes out in a single sheet, a take up roll (that collects the printed substrate in roll form), or is cut from the roll. Due to the photographic process, most of the printers require a darkroom for the loading of media, but once loaded, the machine sits in normal room lighting. Some models have a computer front-end, and others can be connected to a network of Mac and PC computer stations.

There is no ink involved in continuous tone prints; there is also no discernable dot pattern. The detail that this type of printer can provide is so clear and sharp that these machines are used for satellite imaging by government agencies — detail

down to 3-meter resolution! These printers are also appropriately expensive, costing anywhere from $120,000 to over $225,000.

Tip Images destined to be output on a continuous tone printer should not be sharpened as you would usually do. All of the manufacturers utilize their own sharpening software. If you've sharpened the image, more than likely you'll have some pretty ugly effects and artifacts to deal with.

LightJet

Océ LightJet printers operate by having a set of lasers in a drum that beam light through a prism and onto the media. The drum and prism travel the width of the media, scanning the surface at an incredible 4,000 lines per inch. By having the printhead traveling along the surface, the focus of the light is constant, and there is absolutely no distortion from one edge to the other. There are no dots involved, only changing colors. These printers are usually found in commercial photo labs and offices that use geological surveys and other satellite imaging data, such as NASA.

LightJet 5000

The 5000 uses a 50" roll of photographic paper or Duratrans film and makes prints up to 48" x 96". This printer is basically a giant film recorder that uses 36-bit color that generates 68 billion colors — but who's counting? A quality 16" x 20" scan at 300 dpi can be enlarged to 32" x 40" without any loss of clarity at all. Due to the printhead technology, there is no fall-off of exposure to the corners, as in traditional enlarging. The LightJet 5000 (shown in Figure 19-14) uses sharpening modes that allow you to work with low resolutions of 150 to 200 dpi and still get super results and large photographs. It sells for around $180,000, but you may find one a little cheaper on eBay. There are 500 to 600 of these printers installed worldwide — the Air & Space Museum in Washington, DC uses one for its wall art.
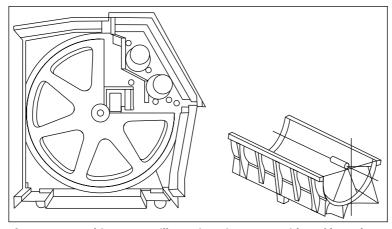
Figure 19-14: This cutaway illustration gives you an idea of how the LightJet works.

LightJet 5500RS

The LightJet 5500RS can produce a 50" x 50" print from a digital file directly onto photographic materials in seven and a half minutes. My coffee pot takes longer! A higher-resolution image the same size will take nearly twelve minutes. The printer can handle a roll of media that is 164 feet long, and operates unattended in a multi-tasking computer environment. The 5000 and 5500RS (the LightJet 5500RS is shown in Figure 19-15) both can use 30", 40", and 50" media. They both use proprietary software to interface with networks and third-party RIPs. A monitor allows on-screen color correction with user interface control over highlight, quarter-tone, mid-tone, three-quarter-tone, and shadow areas.

Figure 19-15: The LightJet 5500RS is a real workhorse.
Courtesy of Océ Display Graphics Systems

You can learn more about LightJet printers at www.oce.com.

Durst

Durst is a German company that makes the Lambda brand of continuous tone print-ers. Unlike the LightJet, laser beams are passed through a prism unit that is

mounted centrally. The prism rocks back and forth to spread the image across the photographic surface. Durst printers also use 36-bit color at 4,000 passes per inch.

This family of printers uses a feature called autonesting, where images are stacked across the substrate automatically to get the highest yield out of the media and processing time. If you have a print that must be duplicated, the printer will gang the prints up to save you time and money. Durst printers can print a single image the full width and length of the roll of media. This line of printers is the most expensive of the continuous tone technology. Durst has complete information on all its printers, including some versatile inkjet models, at www.durst-online.com.

Lambda 76 Plus

Like other continuous tone printers, the Lambda 76 Plus has a 4,000 scan per inch image. Images are extremely faithful to the original photographer or artist's intentions. The software has a Hot Folder that allows people on a network to place images in, and the printer will fit the image into an economical space on the print run. The Lambda 76 Plus uses Durst's patented continuous roll to roll laser exposing system for papers from 8" to 32" wide and has no size limitations — you can print postage stamps and murals on the same run. Maximum roll size is 32" x 164'.

Lambda 130 Plus

With a roll width of 50", the Lambda 130 Plus is the Lambda 76 Plus's big brother. If you have a project that exceeds the width of the roll, software will automatically divide the image and expose it in sections. The operator can select how oversized panels are tiled, including the overlap. Besides that, images can be rotated, mirrored, or cropped and corrected in sharpness, color, density, and contrast without re-rasterizing the image.

The Lambda 130 Plus is fast — it can print 500 square feet per hour at the lower resolution. That's a photo 50" wide by 120' long — not bad for something done while you're eating lunch or working on another job. This printer has a 5-position paper turret for unexposed media that is menu-selected by the computer when a different type or size of substrate is necessary. An Auto Wind-up device automatically threads and starts the new media onto the take-up roll.

Chromira

Images from a Chromira printer are superior to the image quality from a good inkjet printer. Resolution in continuous tone printers is in pixels per inch (ppi), whereas inkjets measure resolution by dots (of ink) per inch (dpi). Professionals agree that it takes 5 to 6 times the dpi to match continuous tone resolution. That said, an inkjet would need to produce 1,500 dpi to match Chromira's 300 ppi. However, Chromira uses a patent-pending optical system that sharpens each pixel and prints them at a higher resolution of 425 ppi. Sounds like funny math to me, but the results are stunning!

The Chromira printing process uses LEDs passing light through fiber optics to place an image on the substrate. An air compressor comprises part of the Chromira

setup, although rumors that the air is used to blow the light from the LEDs onto the paper are unfounded. Chromira printers use three LEDs to expose the media — red, yellow, and blue. The idea of using a fourth black LED was abandoned.

These printers keep track of the paper on the roll and warn the operator when the supply is low. That warning could take some time — the length of the roll can go up to 275'. They also do automatic nesting and tiling of images. Interestingly, when troubleshooting the printer, vocal commands are heard coming from the computer, telling you what to do next. You can read more about this line at `www.zbe.com`.

Media for the RA4 Printer (30" or 50" models) can be loaded or unloaded in less than a minute. Naturally, you'll need darkroom conditions for that process, but normal operation is in room light. At a weight of 350 pounds, you'd better put it down in the right place the first time. The operating system is Windows 2000, and is embedded in the printer itself. The RA4 50 will print 150 8" x 10" prints from a 50" wide roll in an hour. If you're planning on doing a very large mural, it will print an image 50" wide by 160' long in a single eight-hour day.

The RA4 printer is networked, and each computer on the network can control every phase of the printer's operation, including the rearrangement of file order, number of prints, color adjustments, scaling, rotation, and enlargement or reduction. No operator is necessary to run the printer. A really great feature is that printing can start before the entire image has been received by the RA4. If a network delay stops transmission of the file, the printer will simply pause. No artifacts will be visible in the finished print.

Printing without a Computer

Perhaps you are not that computer literate, you just don't feel like getting involved with learning software programs, or you don't need to make refrigerator-sized prints from your photos. What can you do? Fortunately, several alternatives are available, and this is only the beginning — the advances in hardware, software, and good old creativity expand every day. I will start with the assumption that you either don't have a computer, or at the least, you don't want to use the computer to process your photos. Possibly, you just want to use your digital camera just as you did your old 35mm, and have 4" x 6" prints to pass around or place in an album. You have your choice of inkjet or dye-sub technology.

Self-contained inkjet and dye-sublimation snapshot printers

The self-contained type of printer costs a bit more than some nice, and much more versatile, desktop inkjet printers, but using it is straightforward. You don't have to

worry about drivers, cables, connections, variable paper sizes, or multiple dialog boxes. You simply place your digital camera's removable media card in one of the slots on the printer and direct it to print. Within a couple minutes you'll have shiny, clear photos in your hands. The only drawback to the system is that you can't do any real retouching if it's necessary. Some allow for contrast/brightness, and minor color adjustments, but you won't be able to get the glare off Uncle Bill's glasses.

Dye-sub printing provides a continuous tone image that looks and feels just like traditional photographic prints. The output is powerful in terms of fine detail and superb color. This type of printer is used successfully in a wide range of applications, which include the following:

- ✦ **Photography:** Test prints or final results for professional and amateur photography
- ✦ **Real estate:** Listings and appraisals
- ✦ **Graphic arts:** Mockups, comprehensive layouts, and client approvals
- ✦ **Travel and tourism:** Share or bring home snapshots taken on vacation
- ✦ **Medical:** Documentation for surgery and following the course of disease and treatment
- ✦ **Science:** Record laboratory tests
- ✦ **Insurance:** Accident claims
- ✦ **Law enforcement:** Crime and accident scenes

Sony DPP-SV77

This compact printer is less than a foot square, and about three and a half inches tall. As you can see in Figure 19-16, the DPP-SV77 has a 3.2" DSTN color LCD monitor that is a touch panel. The screen allows you to select and manipulate your prints without a TV monitor or computer. The menu on the screen permits you to print 1, 2, 4, or 9 frames per 4" x 6" sheet, or an index print. You can get two different sized prints from this printer; a borderless 4" x 6" or an economical 3.5" x 4" size. The resolution for the larger print is 2,466 x 1,664, and the printer uses a dye-sub method of printing that provides continuous tone quality. A full-size print takes about a minute and a half, while the economy print only takes a minute.

The DPP-SV77 has a suggested retail price of $599, and if you're so inclined, it can be connected to a Mac or PC via USB. With the computer connected, you can do all the editing you want, and feed RGB files in JPEG, TIFF, BMP, and GIF format to the printer. There's also a Video Out port for connection to a TV set. The paper tray is automatic feed, and holds 25 of the postcard size sheets, or 30 pieces of the smaller sheets.

Figure 19-16: Notice the touch panel screen on the DPP-SV77 (left); the DPP-SV88 (right) boasts a CD-R/RW drive.
Courtesy of Sony Electronics, Inc.

Sony has a cousin machine named the DPP-SV88 (suggested retail $899) that lacks the LCD display and must be connected to a TV for viewing. This unit boasts an 8 x 4 x 24 CD-R/RW drive, however, so you can download your photos from the memory cards directly to a CD. It is the same size as the DPP-SV77, but all the controls are in the front and it is intended for mounting in an AV system rack. You can view, print, or archive from CD Mavica CD-R/RW disks without finalizing. So, besides the convenience of printing from your memory cards, you can print from CDs. Both printers accept Memory Stick, PC Card Type I/II; with a PCMCIA adapter you can also take Compact Flash Type I/II, SmartMedia, and SD/MMC. Another important feature of both printers is that all the prints are laminated to seal the dye into the print to resist color shift and fading.

Olympus P-400

The Olympus P-400, a $999 dye-sub printer, provides direct printing from SmartMedia, PC Card, CompactFlash, or Memory Stick as well as connectivity to Mac and PC through USB or Parallel ports. It cranks out an A4-sized (8.25" x 11.7") print in 90 seconds. A single print costs about $1.90, and you can place from 1 to 16 images on the page. In the card-printing mode, you can get 2 or 4 postcards per page. There's a photo album setting that prints from 1 to 6 images with a background image, and an index method that gives you from 45 to 260 images per page. As with all the dye-subs, a protective clear laminate layer protects the image.

A nice touch is the possibility of printing in full color, black and white, and sepia. The center of the control panel (see Figure 19-17) contains an LCD panel that allows you to preview or select images. You can create a print selection of up to 50 copies at a time. Images can be trimmed, framed, date stamped, and have a background

image applied. Olympus has a smaller, battery-operated printer called the P-200 that prints 3" x 5" color prints. It's great for proofing your shots in the field, or if you don't need larger prints. The P-200 sells for $399. You can read more about Olympus photo card printers at www.olympusamerica.com.

Figure 19-17: The Olympus P-400 prints an 8" x 10" print in a minute and a half.

Canon S820D Photo Printer

The Canon S820D is an inkjet printer that uses Canon's unique Bubble Jet Direct technology to output an 8.5" x 11" photo in two minutes or a 4" x 6" print in a minute. The printer receives image information directly from the Canon PowerShot S30 and S40 digital cameras via a Direct Interface cable. You can also input data through CompactFlash, Smart Media, Memory Stick, IBM Microdrive, or SD Cards. A CompactFlash PCMCIA adapter is included with this $399 printer. The S820D (shown in Figure 19-18) uses a 6-color print technology with 1,536 nozzles — each of the six colors has 256 nozzles. It features a 4 pL ink droplet for spectacular print resolution and 49 gradation levels to reduce graininess. Many types of normal, gloss, high gloss paper stock, and transparencies can be printed, including 4" x 6" borderless cards. Banners can be printed by printing up to as many as six connected sheets.

The printer can be connected to any Mac or PC, and comes bundled with PhotoRecord, ZoomBrowser EX, and PhotoStitch for Windows machines; ImageBrowser and PhotoStitch for Macs. Printing from a computer yields 2,400 x 1,200 dpi resolution, but the Direct Camera connection only allows for 1,200 x 1,200 dpi. An optional 1.5" Color TFT LCD display for viewing images before printing costs $99.

Figure 19-18: The Canon S820D photo printer provides a cable-to-cam era connection with select Canon cameras.

Canon CP-10

The CP-10, a little gem from Canon, has a list price of $299 (look for better street prices) and prints wallet sized prints (3.4" x 2.1") in just under a minute. All new Canon PowerShot cameras (A10, A20, and IXUS 300) connect via USB ports, and older PowerShot cameras will be able to interact with a firmware update. The CP-10, shown in Figure 19-19, is less than five inches square, and just under two inches tall. After the RGB dye-sub printing is done, a clear protective layer is applied to the print to protect it from fading and minor scratches. Currently it runs on a rechargeable battery pack, or can be powered by an AC adapter, or an optional 12-volt car battery connectivity kit. A media pack of 36 sheets of paper costs about $17.50. Presently, it does not connect to computers, but a connectivity kit is expected in the fall of 2002.

Figure 19-19: Wallet sized prints are available in a minute with the battery-powered CP-10.

Canon CP-100

The CP-100 is a seven-inch square, two and a half-inch tall printer (shown in Figure 19-20) and has just about the same capabilities as the little CP-10. It can print the smaller wallet-sized prints from the same media pack, but it can also print 4" x 6" prints. The larger media packs hold 36 sheets of paper for $24. The printer has a list price of $349.

Figure 19-20: Wallet sized and postcard sized prints can be printed from the CP-100.

HP Photosmart 100 Photo Printer

With the HP Photosmart 100 Photo Printer, you can either connect it to your computer, or run it as a stand-alone printer. As a stand-alone printer, you can place your memory cards in the appropriate slots and start handing your prints around in about two minutes. The Photosmart 100 (shown in Figure 19-21) lists for $179, and uses thermal inkjet technology to produce 2,400 x 1,200 dpi, 4" x 6" color prints. It's small enough to carry in a lunchbox—less than nine inches long, and about four and a half inches square. One drawback for Mac users—it doesn't connect to a Mac, only to PCs.

Figure 19-21: The RGB HP Photosmart 100 Photo Printer only prints 4" x 6" sheets, but does it well.
Courtesy of Hewlett-Packard Company

HP Photosmart 1115 Photo Printer

For only $199.99 (suggested retail price), you can own the Photosmart 1115, shown in Figure 19-22. This printer connects to Macs and PCs via USB, and accepts memory cards from your digital camera. On premium photo papers you can get 2,400 x 1,200 dpi resolution from its RGB thermal inkjet technology. Paper sizes range from 4" x 6" to letter-size, and you have the option of printing envelopes, iron-on transfers, transparencies, and labels if you wish. Black and tri-color inks come in two separate cartridges. The Photosmart 1115 comes with HP Image Editing software, and ArcSoft PhotoImpressions.

Figure 19-22: The 4-color HP Photosmart 1115 doubles as a desktop publishing printer.
Courtesy of Hewlett-Packard Company

Printing via the Internet

Maybe you're just plain lazy or you don't want to mess with printers, supplies, envelopes, and stamps to send your photos around to friends and family. What's a guy or gal to do? How about putting your images on the Web for everyone to see? Using this method of "printing," you upload your photos to the site of your choice, and then just notify everyone via an e-mailed link that they can see your latest masterpieces whenever they wish.

All the sites described here provide an online album for free, and most let you place an unlimited amount of images on their server. The differences between the sites are the length of time your album remains online, the variety of things you or your friends and relatives can do with the images, and how you get your images to their server. Many sites provide this type of service, but these are the most visible and they've been around long enough to be deemed reliable. All of the services allow access from any Mac or PC.

iPhoto

The iPhoto site is a part of iTools, which became available with Macintosh OS X. You don't have to be working with OS X to use iPhoto, but you do have to be on a Mac with at least Mac OS 9 and the latest Internet Explorer or Netscape Communicator. If you are running a PC, you won't be able to open an iTools account, but you will be able to view a Mac user's albums if you're invited to them.

So go online with your Mac, to `www.apple.com`, click on the iTools tab, and set up your free account. You receive a free 20MB space on an Apple server that you can fill with anything you like, from photos to movies, documents, or files you wish to have viewed by parties you send to the site. If the 20MB is not enough, you can purchase larger chunks of disk space—from 50MB for $50 a year, up to a gigabyte for $1,000 a year. This disk space is called iDisk, and when you sign onto the site, you just have to click a button to bring the iDisk onto your desktop. Then you can begin to add or remove files from it in various folders.

The process for setting up an album is pretty straightforward. Simply place your JPEG images in the Photos folder on the iDisk. From there, it's an easy process to move the photos onto your Home Page, title them, and invite people to view them.

Cross-Reference See Chapter 9 for more on iPhoto.

Club Photo

Club Photo is found at `www.clubphoto.com`, and is the only site featured here that has different levels of membership.

✦ **Basic:** The basic membership is free and gives you an unlimited number of albums that last 90 days each.

✦ **Gold:** If you want what Club Photo calls "permanent" albums, you can upgrade to a Gold Member for $24.95 a year. At that level, you can have 15 "permanent" albums, hi-res downloads, 5 percent off all purchases, guest book notification, login alias, preferential gallery listing, and be eligible for the "photo of the day." You will also get a special Gold Member logo by your name.

✦ **Platinum:** A Platinum Member receives the same benefits as a Gold Member, with minor additions: a 10 percent discount, 30 permanent albums, and album backgrounds for $34.95 a year. By Club Photo definition, "permanent" lasts the length of your yearlong subscription. Both Gold and Platinum also retain unlimited numbers of 90-day albums, however.

Sign up and create your first album. All you need to do is create an album title, type in a brief description, and password-protect it if you wish. PC users can download the free Living Album Software whereby you create an album on your PC's desktop and upload the entire album in one shot. Both PC and Mac users can download Photo DropSoftware, which uploads JPEG files from your computer. If you don't want to download any software, you can upload photos one at a time by typing in a location or by using the Browse button to search for the file on your computer, CD-ROM, floppy, or memory card.

After uploading the photo, you can view, edit, upload more, or share the images. You're also given the opportunity to purchase prints, gifts, or upgrade your account. Prints from your images range from $0.45 for a 3" x 5" to $3.99 for an 8" x 10". The standard 4" x 6" costs $0.45 — same as the smaller prints.

What sets Club Photo apart from the other sites is the wide selection of items that you can purchase with your image:

✦ **Coasters:** You can get a set of four long-lasting chipboard drink coasters with your image on it for $13.95. A set of eight sells for $24.95. If you don't have a digital image, but have a photographic print, you can send the print via regular mail and Club Photo scans the print and reproduces it on the coasters. Be sure to include a self-addressed, stamped envelope in order to get the print back, or Club Photo destroys the print.

✦ **Photo albums:** You can purchase 4" x 6" or 5" x 7" photo books that are spiral bound albums of your photos.

   • If you have 1 to 6 images (4" x 6", one per page) in the book you pay $5.95 per book.

   • If you have 11 to 20 photos, the charge is $17.95 per book

   • If you have 51 to 60 photos, the charge is $32.95 per book.

   • The 5" x 7" books are slightly more expensive, ranging from $7.95 to $37.95.

   There is a charge of a couple more dollars each for shipping, depending on the number of pages and the size of the book. It takes about three days to ship.

✦ **Jewelry:** You can have an image enameled in color onto a 14K gold circle, oval, or heart pendant for $85.

✦ **Magnets:** Photo magnets are available for $4.95.

✦ **Coffee mugs:** Mugs are available in two sizes:

- 11-oz. for $12.95
- 15-oz. for $14.95

✦ **Goodies:** Best and most creative of all, you can get a dozen shortbread cookies with your image on the icing. They come in a tin along with a half-pound of jelly beans for $39.95 or two dozen cookies for $46.95.

They also sell a large selection of frames, aprons, t-shirts, and they'll even turn your image into a pencil sketch, watercolor, or oil painting. This is a very versatile outfit!

Ofoto

Kodak sponsors this site (`www.ofotot.com`). Like the others, membership is free, and you can either send in film to be processed and put online or burned to a CD-ROM, or you can upload your own images into albums. To upload your digital images, first download its free software for either a PC or Mac computer. Then you only need to browse your hard drive, floppy, CD-ROM, or camera's memory card to select images. Use the slideshow and magnifying glass to view the images. Then you can edit your images with OfotoNow software before you upload them.

You can have Ofoto print photos for you:

✦ **4" x 6" prints:** $0.49 each

✦ **8" x 10" prints:** $3.99 each

✦ **20" x 30" prints**: $19.99each

✦ **A sheet of four wallet-sized prints:** $1.79 per sheet

Note Keep in mind that your image must fit certain qualifications before being printed at any size. If the image has too little information to be enlarged, you will be warned of that fact. If you still wish to print it at the desired enlargement, you must sign an acknowledgement that you've been told it's not going to look very good.

You can have 18 different styles of 5" x 7" folded greeting cards printed on premium card stock by Ofoto. If you wish, it will print and mail the cards for you, or send the completed prints to you with envelopes to address and mail yourself. The price for 1 to 9 cards are $2.99 each; the price per card decreases as you order more, with 101 cards or more costing only $1.49 each. Naturally, postage is extra. You can design the format of these cards, or you can choose standard styles including the following:

✦ party invitation

✦ sharing love

> ✦ thank you
>
> ✦ new address
>
> ✦ children's party

Photo cards are 5" x 7", and printed either vertical or horizontal, depending on your image. Your photo occupies just over half of the sheet, and your message goes on the remainder. You can choose from the same styles as the greeting cards. Prices start at $14.95 for a set of 20, including the print and envelopes. Mix and match the designs you want, each additional set is only $10.00.

Folded insert cards are also available. These items have a card stock frame that the photo is inserted into. You have many border schemes to choose from. One to two sets cost $15.00 each, over ten sets are $11.00 each.

Being owned by Kodak, it's not surprising that Ofoto processes film. A 36-exposure roll of 35mm film costs $23.08 to be processed and printed on 4" x 6" Kodak paper. Storage space is free on its site, and you are given an unlimited amount of space, at that. Ofoto also sells a nice variety of frames and of course you can have your images produced on a CD-ROM.

Imagestation

Sony has a lot to show you at `www.imagestation.com`. After all, it makes a lot of products, and your membership is free. After you register, you receive an e-mail confirmation. You must open this e-mail and click on the link in order to activate your membership. Then you can create your album. Imagestation allows you to title the album, give it a description, and then rate it:

> ✦ G for General
>
> ✦ PG for Parental Guidance
>
> ✦ R for Restricted

You can also password protect an album if you want, and you have the option of letting other people contribute to the album — after you approve each picture. There's a button that you can check to keep uninvited guests from ordering prints or gifts from the album. You can also list your album in a gallery for the public to see. Choose a category and then a subcategory — there are literally hundreds to choose from.

In order to get your images online, you need to download the Upload Plug-in. It only takes a few minutes to download the file. Then you quit your browser, run the installer, and fire up the browser again. When you sign in at Imagestation, you have a target on the upload page that you simply drag and drop images onto. You don't have to wait for each one to completely upload, either. Just drag the images onto the icon as you wish. A progress bar lets you know how you're doing and how long it will take to finish.

You can order prints at what seems to be the going rate:

✦ **4" x 6" prints:** $0.49 each

✦ **8" x 10" prints:** $3.99 each

✦ **20" x 30" prints:** $19.99 each

You can order a variety of other products:

✦ Eleven-ounce coffee mugs with two 270 x 234 pixel images for $16.95

✦ A dozen and a half picture cookies for $29.95

✦ Mouse pads for $9.95 each

✦ Ten-packs of two- and three-panel cards from Hallmark that sell at $25.00 and $32.50 respectively

Frames are available that range in price from around $15 to $50. You must choose an image to display in the frame before you get to see the frame selections. Your photo is then shown inside the frame to help you decide on the correct look for your photo/frame combination. Warnings abound if your image will not reproduce at the size you have chosen. If you need that image to work at a particular size, you'll have to resize the original image on your computer and upload the new, larger file.

Shutterfly

Registration on Shutterfly (`www.shutterfly.com`) is just as easy as the other sites. Just provide your name, e-mail address, and your selected password. You upload photo files to the site by typing in their location or using the Browse button to find the image on your system. The image is automatically uploaded, but a window appears, warning you not to close the window or the upload will quit.

Photo print prices are the same as most other sites:

✦ **4" x 6" prints:** $0.49 each

✦ **5" x 7" prints:** $0.99 each

✦ **8" x 10" prints:** $3.99 each

✦ **A sheet of four wallet-sized prints:** $1.79 per sheet

Shutterfly gives you a break when you order multiples of the same print. For instance, order 50 to 74 4" x 6" prints, and the cost drops to $0.47 each, 20 to 49 8" x 10" prints cost $3.79 each, and wallets drop to $1.54 if you order more than 100 sheets. The back of the print can be imprinted with your message if you wish, and a mailing list that you provide can be used to select which recipients you wish to receive the prints. This could be a valuable tool if you want to use these prints for self-promotion.

Shutterfly offers a variety of other services and products:

✦ **Processing:** When you have a roll of 35mm or APS film that needs processing, Shutterfly processes and prints them at 4" x 6" size for a total of $9.99 (20 prints),

or $13.99 (30 prints), including shipping and handling and up to 50MB storage online. The film is processed, scanned, and put online. Your account is credited with the appropriate number of prints. You select the images and number of prints you wish to be printed. Naturally, you can order more prints.

✦ **Frames:** If you want a frame for your photo, Shutterfly has quite a range of them from $10 to $15 for most 4" x 6" frames to under $20 for most of the larger sizes. A few in the 8" x 10" size cost over $20. Your image is displayed in the frame while you make your choice, and size/quality warnings are given if your image is too small to reproduce at your selected size.

✦ **Real time photo adjustments:** Shutterfly allows you to adjust the photo in real time. You can make the print black and white, change the color tone to a sepia or other type of monochrome, adjust the saturation, and add soft focus. All are adjustable with sliders (with the exception of the black and white mode). You can see the results of your adjustments within the frame of your choice, and even rotate the image.

✦ **Cards:** You can upload addresses from Outlook or your Palm, and Shutterfly will mail printed cards for you. You can also have them send you the printed cards and envelopes so you can mail them when you wish. Ten to twenty cards cost $2.49 each, with price breaks up to 100 ($1.49 each).

✦ **Snapbooks:** Snapbooks are available as well. A one- to six-page Snapbook in 4" x 6" size costs $6.99, and a 5" x 7" sells for $8.99. A 20-page 4" x 6" book costs $14.95, and would be a great way to display and share a wedding or birthday celebration.

✦ **Holiday cards:** If you're interested in those kinds of cards you see during the holidays that have a photo on one half, and a season's greetings type message on the other, you can get 4" x 8" cards at a price of $0.99 each for 25. One hundred of them are only $0.82 each.

✦ **CD-ROMs:** You can have your photos placed on a CD-ROM for archival purposes or sharing with friends around the world. Up to 50 images costs $9.99, 200 images costs $19.99, and you'll spend $39.99 for 1,000. Obviously you may not get 1,000 images on a CD-ROM, depending on the size of each image.

Snapfish

Snapfish (`www.snapfish.com`) starts with the same type of easy registration and is free as well. It also accepts film for processing, and during the registration process, you can input your credit card information for future needs. Then you choose an album type and upload the images via typing their addresses, or using the easy Browse button to navigate your system. The day I registered, a promotion entitled me to 10 free prints. Most of these sites have one promotion or another for free prints or film.

The prices for prints are just a bit higher on Snapfish, but not much:

✦ **4" x 6" prints:** $0.59 each

✦ **8" x 10" prints:** $3.99 each

If you'd like to create greeting cards, a link takes you to cardstore.com, where you can choose from 5" x 7" folded cards and envelopes, 4.25" x 6" postcards, and 5" x 7" postcards. Then you can select your choice of colors and fonts to create a personal greeting. The cards can be sent to you for your own mailing schedule, or Snapfish will mail them directly. By simple calculations, the site tells you whether you will have white space on the sides or top and bottom of the image due to the photo's aspect ratio. You can also select a personal border. There's even a choice of U.S. postage stamps!

When you're through with all your choices, you can view the results in Adobe Acrobat before committing to print. On-site software allows you to crop, adjust color, and remove red-eye before you buy:

- ✦ **1 to 10 prints:**
    - • **4" x 6" prints:** $1.09 each
    - • **5" x 7" prints:** $1.49 each
- ✦ **20 to 99 prints:**
    - • **4" x 6" prints:** $0.88 each
    - • **5" x 7" prints:** $1.09 each

5" x 7" folded cards are also available:

- ✦ **1 to 9 cards:** $2.99 each
- ✦ **20 cards:** $1.79 each.

Film processing is Snapfish's strongest selling point. It develops and gives you a single set of 4" x 6" prints from a 36-exposure roll for a total of $4.98, including shipping and handling and storage space (up to 60MB). That's a pretty good deal. Ofoto and Shutterfly both charge over $20. Snapfish's film processing is even cheaper than Costco or Wal-mart.

To share an album, you enter your friend's e-mail addresses in a list. You can select individuals from this group each time you have a different album. Snapfish sends out the invitation to view the album, but e-mail addresses are not seen by anyone other than the recipient. Your friend gets the message that you have an online album, and they're invited to view and order prints. You have the option to let people copy the photos to their own accounts, download hi-res versions, make a CD, or re-share the album. Or, you can be selfish and restrict them to viewing and ordering prints only: They won't be able to re-share the album. You can have as many photos you want per album; none are visible to the public. Your friends must join Snapfish in order to view your photos, however. They will receive a message confirming their membership, and when they sign in on the site, they're able to see your photos. Your album is saved in their account, and stays there until you or they remove it.

PhotoWorks

For more than 24 years, PhotoWorks (`www.photoworks.com`) was known as Seattle FilmWorks. During that time, its main business was 35mm film processing. Now it has modified operations to provide more service for the digital photography market. PhotoWorks still processes film, but now instead of just prints and a replacement roll of film, you can receive your images on a CD or on its Web site.

The process is straightforward — simply send in your roll of exposed conventional 35mm or APS color film, a single-use camera, your photo CD from another source (even your own), or the memory card from your digital camera. PhotoWorks processes the film if necessary and then creates color prints using traditional Kodak photographic solutions and paper. Then it places your images online and sends you an e-mail saying that your pictures are ready. Set up an address book on its site, and you can select people to share your pictures with — you don't have to upload the pictures! You also have a free option to create an album of your favorite photos that you can share, create a family calendar, make greeting cards, or gifts.

How about a DVD or VHS tape of your pictures? No problem at PhotoWorks. With its proprietary software (available as a free download from PhotoWorks), you can create a multi-media presentation complete with themes and music. Depending on the number of photos involved, a DVD or VHS tape costs from $24.95 to $39.95.

Send PhotoWorks your film (in its postage-paid envelope) along with a check for $14.45, and you'll get back two sets of 4" x 6" prints. PhotoWorks uses hi-resolution scanning to provide e-sharing and archiving. You'll also receive Pictures On Disk(tm) (your images on a CD) with MGI PhotoSuite(r) image editing software, your negatives, an index print, and a roll of new color film. For around $20, you can have a spiral-bound desk calendar (8.5" x 6") or wall calendar (8.5" x 11"). Photo cards, brag books, frames, musical jewelry boxes, mugs, mouse pads, puzzles, and leather bound albums are also available.

Summary

Wow, a lot of territory has been covered in this chapter. You learned how laser, inkjet, dye-sublimation, and continuous tone printers worked, and why you would want to use or purchase one or another. Then you found out about various models of printers from several printer manufacturers, where you could find more information about them, and where the larger models could be found. From there I took a look at the small-scale photo card printers for people who want to print directly from their cameras with or without computer intervention. Finally, you found out that you can share images with the entire world at a really great price — free. Then you can order prints, coffee mugs, t-shirts, frames, and more from the same place your albums are stored. What a great way to show off your creativity or the events that make your life special!

✦   ✦   ✦

Appendixes

✦   ✦   ✦   ✦

The appendixes are informational resources that are intended to help you find even more information on digital photography and show you where to shop and where to find similar commands across a variety of image editors. The final appendix describes the contents of the CD-ROM that accompanies this book.

✦   ✦   ✦   ✦

Performing Equivalent Tasks with Various Image Editors

✦   ✦   ✦   ✦

In This Appendix

Photoshop 7

Photoshop Elements

PHOTO-PAINT 10

Paint Shop Pro 7

✦   ✦   ✦   ✦

Although the purpose of this book is to inform the reader about the basics — and hopefully more — of digital photography, it is more than likely that a photographer will want to do more than just take the photo. In other words, image editing may be in order, either to correct or create something. To that end, this appendix is an attempt to give the reader a comparison of the features available in the most visible digital editing programs on the market: Photoshop, Photoshop Elements, PHOTO-PAINT, and Paint Shop Pro.

Without a doubt, Adobe Photoshop is the industry standard. If you are at all serious about your images and want to be able to have complete control over your work, you'll most likely end up using Photoshop. However, I don't mean to suggest that Photoshop is the only program worth owning. Adobe Photoshop Elements seems — at first glance, anyway — to be a very watered-down version of Photoshop, but in fact, it has many of the major features that are important in most image-editing projects. The strongest feature of Photoshop Elements is the Hints and Recipes that guide the novice through even the toughest tasks. Jasc's Paint Shop Pro began as a shareware program, and even though it only runs on the Windows platform, it has a very large user base of very satisfied customers. Paint Shop Pro has a very good range of tools and effects that enable you to complete your work. Corel PHOTO-PAINT has a well-developed toolset and contains many important features.

Each of these programs has features that the others don't, but it is safe to say that Photoshop has the lion's share of tools, filters, effects, features, and controls. However, it also costs

six times as much as the other programs. Adobe has spent considerably more time and money than the other makers on programming and development. I guess that's why they get the big bucks!

With the exception of Photoshop, the other three programs are sold at prices under $100, and are quite often given away or bundled with digital cameras, scanners, or computer systems. Casual users can get by in style with these three programs. Photoshop Elements doesn't support CMYK printing; therefore, it is excluded from commercial printing of any kind. Well, that's not totally correct. You can certainly send an RGB file to a service bureau or printer, and they can convert it to CMYK and provide printed copies, but you won't have the control over the image that the other three programs have. Photoshop Element also lacks Channels, which prevent the user from making a whole host of corrections or creative actions.

All these programs enable you to get files efficiently and economically Web-ready to a certain degree. Photoshop comes bundled with Adobe ImageReady so you can optimize your images for the Web more efficiently. Paint Shop Pro has an Animation Shop interface for the creation of Web animations. PHOTO-PAINT and Photoshop Elements don't have bundled Web applications, however. For this reason, most Web-based activities that are handled with the add-on programs have not been addressed in this appendix. After all, this is a book about digital photography, not the Web.

Paint Shop Pro and PHOTO-PAINT have many of the same features as Photoshop, but use different names for those features. In this appendix, the difference in names is indicated where applicable.

Dozens of actions can be carried out with one-button clicks in one program but take more steps in another program. In these cases, I only deal with the single-click version. Quite often another program can do the same function, but not in a single step.

The information in the tables that comprise this appendix is divided in loose groups of similar functionality:

✦ **Adjustments:** In this section, I discuss the overall tonality of an image and the tools and programs that can help to correct or modify images.

✦ **Drawing:** In this section, I cover creative tools that allow you to actually "draw" or "paint" something.

✦ **Features:** In this section, you find the bells and whistles that make programs more comprehensive, easier to use, or more fun.

✦ **Tools:** In this section, I compare selection tools, cropping tools, and blending, darkening, and modifying tools.

✦ **Type:** In this section, you can shop for the means to work with headline and body text in a digital image.

✦ **Web and Animation:** In this section, I explore the built-in Web attributes of some programs (others have separate programs for this purpose).

Naturally, you will see a crossover in terms and functions. If you need specifics, you can contact the manufacturers through the Web addresses listed at the end of the appendix.

Although this appendix is designed to be a comparison of program features, you may also find that it serves as a minor glossary of terms. I hope you find it as useful as I did in compiling it.

Note

In the following charts, *base color* refers to the color of the original image, *blend color* is color being applied by editing or painting, and the *result color* is the combination of base and blend colors.

I compare four image-editing programs in this appendix. In the interest of readability, I abbreviate them as follows:

✦ **PS7:** Adobe Photoshop 7

✦ **PE:** Adobe Photoshop Elements

✦ **PP10:** Corel PHOTO-PAINT 10

✦ **PSP7:** Jasc Paint Shop Pro 7

<table>
<tr><td colspan="6" align="center">Table A-1
Adjustments</td></tr>
<tr><td>*Task/Tool*</td><td>*Description*</td><td>*PS7*</td><td>*PE*</td><td>*PP10*</td><td>*PSP7*</td></tr>
<tr><td>Add mode</td><td>Values of blend color and base color are added.</td><td>No</td><td>No</td><td>Yes</td><td>No</td></tr>
<tr><td>Behind mode</td><td>Affects transparent parts of a layer only.</td><td>Yes</td><td>No</td><td>Yes</td><td>No</td></tr>
<tr><td>Black merge mode</td><td>In a CMYK image, blend color replaces black channel.</td><td>No</td><td>No</td><td>Yes</td><td>No</td></tr>
<tr><td>Blue merge mode</td><td>In an RGB image, blend color replaces blue channel.</td><td>No</td><td>No</td><td>Yes</td><td>No</td></tr>
<tr><td>Burn mode</td><td>Lightness values of blend colors darken colors of lower layers, darkening the image.</td><td>No</td><td>No</td><td>No</td><td>Yes</td></tr>
<tr><td>Clear mode</td><td>Changes pixels to transparent; must be in Line, Paint Bucket, Brush, or Pencil tool; or Fill or Stroke command.</td><td>Yes</td><td>No</td><td>No</td><td>No</td></tr>
<tr><td>Color Burn mode</td><td>Darkens the image's base color by combining with blend color.</td><td>Yes</td><td>Yes</td><td>Yes</td><td>No</td></tr>
<tr><td>Color Dodge mode</td><td>Brightens base color to reflect blend color through a decrease in contrast.</td><td>Yes</td><td>Yes</td><td>Yes</td><td>No</td></tr>
</table>

Continued

Table A-1 *(continued)*					
Task/Tool	*Description*	*PS7*	*PE*	*PP10*	*PSP7*
Color mode	Luminance of base color and hue and saturation of blend color pre- serves gray levels. Good for tinting color images.	Yes	Yes	Yes	Yes
Cyan Merge mode	In a CMYK image, blend color replaces cyan channel.	No	No	Yes	No
Darken mode	Selects darker of base or blend color as result color. Lighter colors are changed to result color; darker colors are unchanged. (PP10 calls it "If Lighter.")	Yes	Yes	Yes	Yes
Defringe command	Fringe pixels that have a color other than the background color are changed to the color of adjacent pixels.	Yes	No	No	No
Difference mode	Depending on the greater brightness value, the blend color is subtracted from the base color, or the base color is sub-tracted from the blend color.	Yes	Yes	Yes	Yes
Dissolve mode	A random replacement of each pixel to base or blend color, depending on opac-ity of individual pixels.	Yes	Yes	No	Yes
Dodge mode	Lightness values of blend colors lighten colors of lower layers, thus lightening the image.	No	No	No	Yes
Exclusion mode	Lower in contrast than Difference mode, and a softer effect. Blending with white inverts the base color values; no change with black.	Yes	Yes	No	Yes
Green merge mode	In an RGB image, blend color replaces green channel.	No	No	Yes	No
Hard Light mode	When blend color is lighter than 50% gray, image is screened lighter; if blend color is darker than 50% gray, image is multiplied darker. Used to add highlights or shadows.	Yes	Yes	Yes	Yes
Hue mode	Luminance and saturation of base color are added to the hue of the blend color.	Yes	Yes	Yes	Yes
Invert mode	Inverts the value of the blend color and adds that value to the base color.	No	No	Yes	No
Lighten mode	Selects lighter of base or blend color as result color. Darker colors are changed to result colors; lighter colors are unchanged.	Yes	Yes	Yes	Yes

Task/Tool	Description	PS7	PE	PP10	PSP7
Linear Burn mode	Decreases the brightness of the base color to reflect the blend color.	Yes	No	No	No
Linear Dodge mode	Increases the brightness of the base color to reflect the blend color.	Yes	No	No	No
Linear Light mode	When blend color is lighter than 50% gray, image is made lighter by increasing brightness; if blend color is darker than 50% gray, image is made darker by decreasing brightness.	Yes	No	No	No
Logical OR Merge mode	Converts blend and base color values to binary numbers and applies Boolean algebraic OR formula to them.	No	No	Yes	No
Logical XOR Merge mode	Converts blend and base color values to binary numbers and applies Boolean algebraic XOR formula to them.	No	No	Yes	No
Luminosity mode	Hue and saturation of base color added to the luminance of the blend color. Creates inverse effect of Color mode.	Yes	Yes	No	Yes
Magenta Merge mode	In a CMYK image, blend color replaces magenta channel.	No	No	Yes	No
Multiply mode	Multiplies base color by blend color, resulting in darker color.	Yes	Yes	Yes	Yes
Normal mode	Replaces base color with blend color.	Yes	Yes	Yes	Yes
Overlay mode	Depending on the base color, multiplies or screens the colors, preserving the highlights and shadows of the base color. Base and blend colors are mixed, reflecting the lightness or darkness of original colors.	Yes	Yes	Yes	Yes
Pin Light mode	When blend color is lighter than 50% gray, pixels darker than blend color are replaced while pixels lighter than the blend color are not changed; if blend color is darker than 50% gray, pixels lighter than blend color are replaced and pixels darker than the blend color don't change.	Yes	No	No	No
Red Merge mode	In an RGB image, blend color replaces red channel.	No	No	Yes	No

Continued

Table A-1 *(continued)*					
Task/Tool	*Description*	*PS7*	*PE*	*PP10*	*PSP7*
Remove Black Matte command	Object removed from black background has dark pixels surrounding it; this command blends those pixels to the color of adjacent pixels.	Yes	No	Yes	Yes
Remove White Matte command	Object removed from white background has light pixels surrounding it; this command blends those pixels to the color of adjacent pixels.	Yes	No	Yes	Yes
Saturation mode	Luminance and hue of base color added to the saturation of the blend color.	Yes	Yes	Yes	Yes
Screen mode	Multiplies inverse of blend and base colors, resulting in lighter color.	Yes	Yes	Yes	Yes
Soft light mode	When blend color is lighter than 50% gray, image is made lighter by dodging; if blend color is darker than 50% gray, image is made darker by burning.	Yes	Yes	Yes	Yes
Subtract mode	Values of blend and base colors are added, then 255 is subtracted from the result, ending in a darker color.	No	No	Yes	No
Texturize mode	Blend color is converted to grayscale and multiplied by base color value.	No	No	Yes	No
Vivid Light mode	When blend color is lighter than 50% gray, image is made lighter by decreasing contrast; if blend color is darker than 50% gray, image is made darker by increasing contrast.	Yes	No	No	No
Yellow Merge mode	In a CMYK image, blend color replaces . yellow channel	No	No	Yes	No

Table A-2 **Drawing**					
Task/Tool	*Description*	*PS7*	*PE*	*PP10*	*PSP7*
Arrowhead options	Add arrowheads to the ends of vector paths.	Yes	No	No	Yes
Define Brush command	Create size, shape, and other features of custom brushes.	Yes	Yes	Yes	Yes

Task/Tool	Description	PS7	PE	PP10	PSP7
Define Pattern command	An image that is repeated or tiled.	Yes	Yes	Yes	Yes
Erase to History mode, Eraser tool	Erase current image to a saved state or a snapshot.	Yes	Yes	No	No
Finger Painting option	Smears foreground color at the beginning of each stroke.	Yes	Yes	Yes	No
Gradients	Color graduates from center outward to another color.	Yes	Yes	Yes	Yes
Jitter	Specify randomness of changing elements on brush tips.	Yes	No	No	No
Preset brushes	Various brush shapes, textures, . and themes	Yes	Yes	Yes	Yes
Spacing option, Brush	Change the distance between brush marks in a stroke.	Yes	Yes	Yes	Step
Texture	Add a texture to brush strokes.	Yes	No	Yes	Yes
Wet edges	Edge of stroke builds up with paint, as in watercolor.	Yes	Yes	No	No

Table A-3
Features

Task/Tool	Description	PS7	PE	PP10	PSP7
Actions, Recordings	Recorded sequence of events that can be replayed on other documents, incorporated in other Actions, and edited.	Yes	No	Yes	No
Adaptive color table	A custom color table consisting of colors that comprise the image.	Yes	Yes	No	No
Adjustment layers	Allows for color edits or filters to be run on an image without changing the image itself. The layer can be discarded without changing the image. (Called Lenses in PP10.)	Yes	Yes	Yes	Yes
Allow Non-Linear History option	Alter previous states of work on an image without changing later modifications (see History palette).	Yes	No	No	Yes
Alpha Channels	8-bit grayscale images used to mask, manipulate, or protect certain areas of an image.	Yes	No	Yes	Yes

Continued

Table A-3 *(continued)*					
Task/Tool	*Description*	*PS7*	*PE*	*PP10*	*PSP7*
Anti-aliasing	Produces a smooth edge on a selection by partially filling in edge pixels and making them semi-transparent. Solves the jaggies.	Yes	Yes	Yes	Yes
AppleScript	Limited external automation for Macintosh OS allowing scriptable events, such as starting the program and carrying out various commands.	Yes	No	No	No
Apply Image command	Blend layer and channel from a source image into a different (active) destination image.	Yes	No	No	Yes
Auto Erase option	Used with the Pencil tool to erase foreground color to background color.	Yes	Yes	Yes	No
Auto Screens	Allow the program to create optimal screen angles and frequency based on user input about resolution and output device.	Yes	No	Yes	Yes
Automatically Create First Snapshot option	Snapshot of image is taken as document opens. Snapshot can be returned while working and used as image reference or new starting point.	Yes	No	No	No
Automating using Droplets	An Action converted to a small applet that can be installed on the desktop. The main program doesn't have to be running to operate a droplet.	Yes	No	No	No
Background Eraser tool	Variable brush that erases the back-ground of an image to transparent, but ignores foreground objects, based on color differences.	Yes	Yes	Yes	No
Batch command	Applies recorded script or set of actions to a batch or folder of documents.	Yes	No	Yes	No
Batch Rename command	Renames all files in a batch, including change of file type.	Yes	No	Yes	Yes
Bevel and Emboss effect	Adds variable amounts of light and shadow to layers to give appearance of a raised or lowered surface.	Yes	Yes	Yes	Yes
Bicubic interpolation	Allows user to choose smooth quality method to assign color values to pixels created through resampling.	Yes	No	No	No

Task/Tool	Description	PS7	PE	PP10	PSP7
Bilinear interpolation	Allows user to choose medium quality method to assign color values to pixels created by resampling.	Yes	No	No	No
Blend Clipped Layers as Group option	Base layer acts as mask to the whole group. This option treats the clipped layers as a group.	Yes	Yes	Yes	No
Blend If option for layers	Used to specify which pixels from the active layer, and which pixels from the underlying layers will appear in the image.	Yes	Yes	No	Yes
Blend Interior Effects as Group option	Applies blending mode of the layer to other layer effects that modify non-transparent pixels.	Yes	Yes	No	No
Borders	Prints a user-defined stroke around an image.	Yes	Yes	Yes	Yes
Bring Forward command	Moves selected layer forward one layer in stacking order.	Yes	Yes	Yes	No
Bring to Front command	Moves selected layer to the front of the layer stacking order.	Yes	Yes	Yes	No
Browse command	Allows user to view thumbnails and navigate through folders to sort, file, rename, and open documents.	Yes	Yes	No	Yes
Button Mode command	Views and operates Action palette with single buttons instead of hierarchical listing.	Yes	No	No	No
Calculations command	Combines channel data from two channelsand applies the result to a destination image.	Yes	No	Yes	No
Calibration bars	Printer scales applied to the sides of color separations.	Yes	No	Yes	No
Canvas, resizing	Changes the size and shape of the area surrounding the image. Known as Paper size in PHOTO-PAINT.	Yes	Yes	Yes	Yes
Captions, printing	Prints caption information entered in File Info dialog box.	Yes	Yes	No	No
Change Layer Content command	Used to change settings of an adjustment layer instead of creating a new adjustment layer. (Use Edit Lens in PP10.)	Yes	Yes	Yes	No
Channel Mixer command	Modifies color channels by using a combination of other channels.	Yes	No	Yes	Yes

Table A-3 *(continued)*					
Task/Tool	**Description**	**PS7**	**PE**	**PP10**	**PSP7**
Clipping groups, knockout	A knockout punches holes through underlying layers. Clipping groups used as knockouts punch holes to user defined layers.	Yes	No	No	No
Clipping paths	A vector path outlining an object to isolate it, making the background transparent for printing or placing in another application.	Yes	No	Yes	No
CMYK color model	Subtractive color mode uses cyan, magenta, yellow, and black for commercial printing; 32-bit color depth creates more than 4 billion colors; also called process color.	Yes	No	Yes	Yes
Color corrections by mixing channels	Modify colors by using a combination of other channels.	Yes	No	Yes	Yes
Color gamut awareness	A color gamut is the range of colors a given device can generate. Some programs warn if a color is out of gamut and will be adjusted.	Yes	No	Yes	No
Color Picker dialog box, Adobe	Dialog box for color choice from Adobe.	Yes	Yes	No	No
Color Picker dialog box, Apple	Dialog box for color choice from Apple.	Yes	Yes	Yes	No
Color Picker dialog box, Windows	Dialog box for color choice from Windows.	Yes	Yes	Yes	Yes
Color Range command	Selects specific color or range of colors within an image or selection. (Use Magic Wand in PP10 and PSP7.)	Yes	No	Yes	Yes
Color separations	Generally produce cyan, magenta, yellow, and black film negatives used in commercial printing.	Yes	No	Yes	Yes
Color tables	Tables made up of colors contained in an image. Limited to 256 colors for file optimization in Web images.	Yes	Yes	Yes	No
Color traps	Used in CMYK printing; colors overlap by choking or spreading in order to negate press misregistration, resulting in white gaps around objects.	Yes	No	Yes	Yes

Task/Tool	Description	PS7	PE	PP10	PSP7
Composite channel	This channel is visible when all the color channels in an image are visible: RGB or CMYK; the full color image.	Yes	No	Yes	No
CompuServe GIF format	A lossless compression means for line art and images with solid colors, limited to 256 colors. Recognized by most browsers.	Yes	Yes	Yes	Yes
Conditional Mode Change command	An Automate command that changes the color mode of an image to another color mode in an Action.	Yes	No	Yes	No
Contact Sheet II command	Creates a contact sheet similar to that provided by a film lab for a roll of film.	Yes	Yes	No	Yes
Contiguous option	Selects pixels that touch each other; used for selections or erasing.	Yes	Yes	Yes	Yes
Contours	Modify the way an effect looks; used on inner and outer shadows, glows, bevels, and embossing.	Yes	No	No	No
Convert to Shapes command	Changes text to a vector mask; text becomes un-editable.	Yes	No	No	Yes
Copy Layer Style command	Copies attributes of one layer and pastes them into another layer in the same image or a different document.	Yes	No	No	Yes
Copyright information, adding to files	Embeds copyright information (metadata) in file using XMP; supported by NAA and IPTC.	Yes	No	No	No
Correcting mistakes, revert to saved image	Revert command allows user to work in last-saved version of document; all changes since that state will be deleted.	Yes	Yes	Yes	Yes
Correcting mistakes, undoing last action	Undo command; number of undos per program depends on availability of RAM on computer.	Yes	Yes	Yes	Yes
Create Layers command	Adds layer for placement of additional parts of image, filters, effects, masks, text, and paths.	Yes	Yes	Yes	Yes
Crop command	Changes the dimension of an image by cutting off marginal edges.	Yes	Yes	Yes	Yes
Crop marks	Printer marks that show the printing company where to trim the page.	Yes	No	Yes	Yes

Continued

Table A-3 *(continued)*					
Task/Tool	*Description*	*PS7*	*PE*	*PP10*	*PSP7*
Cropping images, changing perspective	While cropping, allows squaring-up of images that have a keystone effect due to foreshortening or point of view.	Yes	No	No	No
Curves	Adjust the brightness of channels; 256 . shades of gray are represented by a curve starting at white on the bottom left, going to black at the top right	Yes	No	Yes	Yes
Custom color table	Tables made up of user-defined colors. Limited to 256 colors for file optimization in Web images.	Yes	Yes	Yes	No
Custom Spot Function	Use PostScript commands to create new halftone dot shapes.	Yes	No	No	No
Cut command	Removes selection from document and places it in the Clipboard. May use Paste to reapply the selection to the same or a different document.	Yes	Yes	Yes	Yes
DCS format	Desktop Color Separations is a version of EPS that is used to save spot color channels for printing.	Yes	No	No	No
Delete Color command	Removes a color from a color table; affected pixels will assume closest color from palette.	Yes	No	Yes	No
Deselect command	Releases selected objects.	Yes	Yes	Yes	Yes
Digimark Detect Watermark plug-in	A watermark can be embedded in an image, showing copyright, author, restrictions on use, etc. Programs show copyright symbol in title bar.	Yes	Yes	No	Yes
Distortions, Liquify command	Image can be distorted as if it were on a sheet of putty.	Yes	Yes	No	No
Drop Shadow effect	Adds a shadow with a variety of densities, distances, and softness to create the effect that an object or text is floating above the image.	Yes	Yes	Yes	Yes
Droplets	An Action converted to a small applet that can be installed on the desktop. The main program doesn't have to be running to operate a droplet.	Yes	No	No	No

Task/Tool	Description	PS7	PE	PP10	PSP7
DSC format	Document Structuring Convention is used to have a service bureau trap or impose a PostScript file.	No	No	Yes	No
Duotone mode	A color mode utilizing two colors of ink; one is usually black.	Yes	No	Yes	Yes
Duplicate Channel command	Creates an exact replica of a channel for use as a mask or other effects.	Yes	No	No	No
Duplicate command	Creates an exact copy of the active document for experimentation; doesn't save to hard drive, but keeps it in RAM. User must save it to keep modifications.	Yes	Yes	Yes	No
Duplicate Merged Layers Only option	Allows some layers in the image to be duplicated and others ignored.	Yes	Yes	Yes	No
EPS files, opening	Encapsulated PostScript files can be bitmapped, made into vector art, or a combination. Upon opening, image is rastered into bitmap; vectors are lost.	Yes	Yes	Yes	Yes
EPS files, saving	Encapsulated PostScript files can be placed in most DTP programs for printing; requires a PostScript printer for good output without jaggies.	Yes	Yes	Yes	Yes
Erase to History option	Eraser tool deletes image, replacing it with previous state of the image.	Yes	No	No	No
Export Clipboard option	Allows copied or cut data on Clipboard to be pasted into another application.	Yes	Yes	Yes	Yes
Extract command	Separates foreground object from background and makes background transparent; useful for complex edges and fine subjects such as hair and trees.	Yes	No	No	No
Fade command	A slider to reduce the effects of a just-run filter or effect.	Yes	No	Yes	No
Feathering selections	Soften the edge of a mask or selection by user-input number of pixels.	Yes	Yes	Yes	Yes
Field of View option	Used in 3-D manipulation to adjust the image frame to fit the 3-D object.	Yes	Yes	Yes	No

Continued

Table A-3 *(continued)*					
Task/Tool	*Description*	*PS7*	*PE*	*PP10*	*PSP7*
File Browser	Allows user to view thumbnails and navigate through folders to sort, file, rename, and open documents.	Yes	Yes	No	Yes
Fill command	Floods a selection with a solid color.	Yes	Yes	Yes	Yes
Fill layers	Layers that can be filled with a solid color, gradient, or pattern; becomes layer mask.	Yes	Yes	No	No
Fill opacity	Changes pixels on layer or shapes without affecting layer effects.	Yes	Yes	No	No
Fill with Neutral Color option	Used when a filter needs pixels in the layer in order to work; neutral color is invisible, and is affected by blending mode.	Yes	Yes	No	No
Find and Replace command	Searches document for characters or words and changes them.	Yes	No	No	No
Fit Image command	Part of Automate command; constrains document within user-input dimensions; reduced or enlarged to the smaller of the dimensions.	Yes	No	No	No
Fit on Screen command	Enlarges or reduces full image to fit on screen.	Yes	Yes	Yes	Yes
Fixed Size option	Sets dimensions for marquee selection; single mouse click creates selection at correct size.	Yes	Yes	No	No
Flatten Image command	Combines all visible layers into one single layer for file-size economy and easier printing.	Yes	Yes	Yes	Yes
Flipping images	Mirror the image along a horizontal or vertical axis.	Yes	Yes	Yes	Yes
Flipping layers and selections	Mirror a layer or selection along a horizontal or vertical axis.	Yes	Yes	Yes	Yes
FOCOLTONE colors	Brand of CMYK inks with 763 colors.	Yes	No	Yes	No
Free Transform command	Uses modifier key to do multiple transformations: scale, rotate, skew, distort, and perspective.	Yes	No	No	Yes
Fuzziness option	Part of Color Range; adds or subtracts colors from selection based on how close colors are to selected color.	Yes	No	No	No

Task/Tool	Description	PS7	PE	PP10	PSP7
Gamut	A color gamut is the range of colors a given device can generate. Some programs warn if a color is out of gamut and will be adjusted.	Yes	No	Yes	No
GIF Format	A lossless compression means for line art and images with solid colors; limited to 256 colors. Recognized by most browsers.	Yes	Yes	Yes	Yes
Global lighting	Gives the image the appearance of a single light source.	Yes	No	No	No
Glowing Edges effect	Finds edges and creates a neon glow effect.	Yes	Yes	No	Yes
Gradient Editor	Changes colors and types of gradients.	Yes	Yes	Yes	Yes
Grayscale mode	A color mode utilizing 256 shades of gray; 0 is black, 256 is white.	Yes	Yes	Yes	Yes
Grid and guides	Preset grids and user-definable guides used for alignment within image.	Yes	Yes	Yes	Yes
Halftone screens	Ability to dictate the size, angle, shape, and resolution of dots used in commercial printing.	Yes	No	Yes	No
Hardness option	Adjusts the softness or hardness of brush edges.	Yes	Yes	Yes	Yes
Hexadecimal color values	Color naming convention for Web-safe colors.	Yes	Yes	Yes	Yes
History palette	A record of image modifications allowing user to revert to a previous image state. Changes made to a previous state nullify later changes (see Non-Linear History).	Yes	No	No	Yes
HSB color mode	In this additive color mode, Hue, Saturation, and Brilliance are three fundamental characteristics of the human perception of color.	Yes	Yes	Yes	No
HSL color mode	Hue, Saturation, and Lightness are three fundamental characteristics of the human perception of color; Paint Shop Pro uses HSL additive color mode instead of HSB.	No	No	No	Yes
Image Size command	Used to change the image size and resolution of an image; aspect ratio can be constrained or not; resolution and image size can be changed independently or in tandem.	Yes	Yes	Yes	Yes

Continued

Table A-3 *(continued)*					
Task/Tool	*Description*	*PS7*	*PE*	*PP10*	*PSP7*
Import command	Brings an image into a separate document without opening that image or using copy/cut and paste functions.	Yes	Yes	Yes	Yes
Importing PDF images	Import images in Portable Document Format (PDF) that can contain both vector and bitmap artwork.	Yes	Yes	No	No
Indexed Color mode	Color mode limited to 256 colors existing in the image.	Yes	Yes	No	No
Indexed Color mode	Color mode consisting of colors contained in an image.	Yes	Yes	Yes	Yes
Info palette	Information about color values at the cursor's site; depending on tools and other measurements such as angles, length, height.	Yes	Yes	Yes	Yes
Inner Glow effect	Creates a glow around the inside edges of a layer's contents.	Yes	Yes	No	No
Inner Shadow effect	Creates a shadow within the inside edges of a layer's contents.	Yes	Yes	No	No
Intersect with Channel option	A command to create a single channel from the overlapping areas of two separate channels.	Yes	No	Yes	No
Inverse command	Reverses selection; unselected areas become selected; good for selecting object against solid color background.	Yes	Yes	Yes	Yes
Invert option	Reverses the colors in an image; inverting all channels in a normal (positive) image creates an image similar to a film negative.	Yes	Yes	Yes	Yes
JPEG compression	Lossy compression method created by Joint Photographic Experts Group; best for continuous tone images; may not separate into individual color plates for printing.	Yes	Yes	Yes	Yes
Keystone distortion, correcting	Perspective correction when cropping.	Yes	No	No	No
Lab color model	A color model comprised of Luminance (the grayscale image) in one channel, a channel containing green-red, and a b channel containing blue-yellow.	Yes	No	Yes	No

Task/Tool	Description	PS7	PE	PP10	PSP7
Layer mask channel	A selection created as a mask is converted to an alpha channel and linked to a layer or layer set; layer can be designated to reveal or hide masked area.	Yes	No	Yes	Yes
Layer Mask Hides Effects option	A layer blending option to only allow layer effects to be active in specific areas.	Yes	No	No	No
Layer masks, adjustment layers	Allow for color edits or filters to be run on an image without changing the image itself. The layer can be discarded without changing the image.	Yes	Yes	No	Yes
Layer Set from Linked command	A means of grouping layers for moving, blending, or applying effects as a whole.	Yes	No	Yes	No
Layer styles	Dialog box to apply effects such as shadows, glows, bevel, emboss, colors, strokes, and patterns; sets options and specifics for each effect.	Yes	Yes	No	No
Layer Via Cut command	A selection Cut to the Clipboard is converted into a new layer.	Yes	Yes	Yes	Yes
Layers	Various elements of an image can be placed on separate levels or layers in order to create modifications or effects without changing remainder of image.	Yes	Yes	Yes	Yes
Layers palette	A palette that allows reordering, visibility, addition and deletion of layers.	Yes	Yes	Yes	Yes
Lemple-Zif-Welch (LZW) compression	A lossless compression for images with large areas of solid color.	Yes	Yes	Yes	Yes
Lighting effects	Create various groupings of light with the addition of color and texture to be cast over the image.	Yes	No	No	No
Liquify command	Distorts and deforms parts of an image as if it were a malleable sheet of rubber.	Yes	Yes	Yes	No
Load Actions command	Installs a group of pre-defined Actions.	Yes	No	No	No
Load Selection command	Used to load a previously saved channel into the image; choices to invert selection, browse for channel, determine blending mode.	Yes	No	Yes	Yes

Continued

Table A-3 *(continued)*					
Task/Tool	*Description*	*PS7*	*PE*	*PP10*	*PSP7*
Loading color tables	Load color tables saved from other documents.	Yes	Yes	Yes	Yes
Loading contours	Load previously saved contours used on inner and outer shadows, glows, bevels, and embossing.	Yes	No	No	No
Loading duotone curves	After saving a duotone curve and color arrangement, load the information into a new document.	Yes	No	Yes	No
Loading output settings	Optimized output settings can be saved for loading into other documents.	Yes	No	No	No
Loading pattern libraries	Load pattern libraries saved in previous documents.	Yes	Yes	No	No
Lock Transparency option	When selected, deleted object is replaced with background color; when deselected, deleted object is replaced with layer transparency.	Yes	Yes	Yes	Yes
Lock/Unlock Selected Colors command	Used in color tables to prevent colors from being dumped as numbers of colors in the image are reduced.	Yes	No	No	Yes
Locking layers	Prevent modifications of anything but visibility and arrangement to layer.	Yes	Yes	No	No
Lossless compression	Compression methods that don't lose image data; CCITT, LZW, RLE, and ZIP are examples.	Yes	Yes	Yes	Yes
Mask option, calculations	Combine channel data from two channels and apply the result to a destination image.	Yes	No	Yes	No
Masks	Masks allow the protection and isolation of parts of an image; the non-selected area will be protected from modification, changes will occur on the selected area.	Yes	Yes	Yes	Yes
Merge Channels command	Channels are grayscale images that comprise the document; channels from same color mode (RGB to RGB, CMYK to CMYK, etc.) documents can be merged into a single channel for masking or manipulation.	Yes	No	Yes	Yes
Merge Down command	Merges a layer mask and the layer it masks into one layer; mask is no longer editable.	Yes	Yes	Yes	Yes

Task/Tool	Description	PS7	PE	PP10	PSP7
Merge Spot Channel option	Spot colors are converted to color channels and are deleted.	Yes	No	No	No
Merged for Layer option	When using the Calculations command, Merged for Layer allows multiple channels to be combined into a single channel for Calculations.	Yes	No	No	No
Merged Layers option	Combines all layers of the image at that state into one single layer for a snapshot.	Yes	No	No	No
Modal controls in actions	Allows the user to enter text or numerical values at the appropriate time as an Action is running.	Yes	No	Yes	No
Mode commands	Change from one color mode to another: RGB to Lab to CMYK, etc.	Yes	Yes	Yes	Yes
Multichannel mode	Color mode with 256 levels of gray in each channel; deleting any channel in an RGB, CMYK, or Lab image will change it to Multichannel mode; doesn't support layers.	Yes	Yes	Yes	No
Navigator palette	Small window with thumbnail view of entire image; highlights window view.	Yes	No	No	Yes
New Channel command	Creates a new blank channel.	Yes	No	Yes	Yes
New Color command	Adds colors to Color Table by selecting from image or color pickers.	Yes	Yes	Yes	Yes
New Layer button	Adds an empty layer or creates a duplicate layer for the image.	Yes	Yes	Yes	Yes
New Snapshot button	Creates an interim image of the document at its present state.	Yes	No	No	No
New View command	Creates alternate view at different size and level of zoom of same image in new window.	Yes	Yes	No	No
Noise gradients	Using a user-set color range, randomly distributes colors in a gradient.	Yes	Yes	No	No
Noise in brushes	Creates a random pattern in soft-edge brushes with gray values.	Yes	No	No	No
OLE Automation	Limited external automation for Windows OS allowing scriptable events such as starting the program and carrying out various commands.	Yes	No	Yes	No

Continued

Table A-3 *(continued)*					
Task/Tool	*Description*	*PS7*	*PE*	*PP10*	*PSP7*
Open As command	Choose and apply file type of document as it is opened.	Yes	Yes	No	No
Open paths	A vector-drawn path that has a beginning and an end point; the path can be as simple as a straight line, or complicated as a wavy line.	Yes	No	Yes	Yes
Open Recent command	Lists the last few documents that have been saved within the program.	Yes	Yes	No	No
Out-of gamut colors	A color gamut is the range of colors a given device can generate. Some programs warn if a color is out of gamut and will be adjusted.	Yes	No	Yes	No
Outer Glow effect	Creates a glowing effect around the selection or objects on a layer.	Yes	Yes	No	No
Overprint colors	In the Duotone mode, gives on-screen approximation of one solid color printed another solid color.	Yes	No	Yes	No
Page marks	Printer marks printed outside the image area show the printing company color bars, registration marks, and where to trim the page.	Yes	No	Yes	Yes
Page Setup command	Dialog box that allows user to select page size, scale, and orientation.	Yes	Yes	No	Yes
Paste Into command	Contents of Clipboard are pasted into a live selection area; creates new layer, and selection area becomes layer mask.	Yes	Yes	Yes	Yes
Paste Layer Style command	Copies attributes of one layer and pastes them into another layer in the same image or a different document.	Yes	No	No	Yes
Paths palette	Lists current paths, allows activation, exporting, importing, naming, and reordering in list.	Yes	No	Yes	No
Paths, clipping	Selections saved as paths and used to create a transparent background.	Yes	Yes	Yes	Yes

Task/Tool	Description	PS7	PE	PP10	PSP7
Paths, defining as selection border	Any closed path or border can be used to create a selection.	Yes	No	Yes	No
Paths, recorded in actions	A vector-drawn path can be placed in an image during an Action with the Insert Path command.	Yes	No	Yes	No
Pattern Maker	Creates tiled patterns to fill selections and layers.	Yes	Yes	Yes	No
Picture Package command	Creates multiple copies of the same source image on a single page, similar to that done by photo studios with package deals.	Yes	Yes	No	No
Print One Copy command	Prints one copy of the image without opening dialog boxes; uses currently selected print options.	Yes	Yes	No	No
Print Selected Area option	Prints just a selected portion of the image, ignoring the remainder.	Yes	Yes	No	No
Printing marks	Marks printed outside the image area show the printing company color bars, registration marks, and where to trim the page.	Yes	No	Yes	Yes
Profiles, embedding in documents	Embed color management information in the document to synchronize output across different platforms and applications.	Yes	Yes	Yes	Yes
Proof Colors command	On-screen view of individual color plates used in printing.	Yes	No	No	No
Proof Setup commands	Choose proofing space that you would like to view on-screen.	Yes	No	No	No
Protect Foreground Color option	Background eraser option prevents foreground-colored (in the toolbox) pixels from being erased.	Yes	No	No	No
Purge Cache command	Thumbnail and file information from the File Browser is stored in RAM; purging the cache deletes this information and speeds loading times.	Yes	No	No	No
Purge command	Undo, History, and Clipboard contents are stored in RAM; Purge command deletes these files and speeds program operations.	Yes	Yes	No	No

Continued

Table A-3 *(continued)*					
Task/Tool	*Description*	*PS7*	*PE*	*PP10*	*PSP7*
Quadtones	A grayscale image printed in four colors; each grayscale has a different range of tone and contrast.	Yes	No	No	No
Quick Mask mode	A selection is converted to a Rubylith-type mask that can be painted with black to add to the mask, or white to subtract from the mask; painting with gray adds levels of transparency.	Yes	No	No	No
Randomize option	Used when creating a noise gradient; each click of Randomize rearranges the alignment of colors within the gradient.	Yes	Yes	No	No
Rasterize command	Converts vector art and text into bitmap artwork that can be edited with painting tools or filtered; creates a flattened raster image.	Yes	Yes	Yes	Yes
Raw format	Cross-platform, cross-application file format describing each pixel as 0=black, 256=white; RGB or CMYK channels sent sequentially.	Yes	Yes	No	Yes
Recordings, Actions	Recorded sequence of events that can be replayed on other documents, incorporated in other Actions, and edited.	Yes	No	Yes	No
Redo command	Undoes an Undo; number of Redo commands dependent on user setting and available RAM.	Yes	Yes	Yes	Yes
Remove Layer Mask command	Removes a Layer Mask with the option of applying the changes or discarding them.	Yes	Yes	No	No
Replace Channel option	With a selection and an existing channel open, user can choose to Replace contents of existing channel with the selection.	Yes	No	No	No
Resample	Used to change the image size and resolution of an image; aspect ratio can be constrained or not; resolution and image size can be changed independently or in tandem.	Yes	Yes	Yes	Yes
Reselect command	To reselect the most recently selected area, choose Select ➪ Reselect.	Yes	No	No	No

Task/Tool	Description	PS7	PE	PP10	PSP7
Resize	Used to change the image size and resolution of an image; aspect ratio can be constrained or not; resolution and image size can be changed independently or in tandem.	Yes	Yes	Yes	Yes
Resize Image command	In Image menu, changes resolution, pixel dimensions, and print size of image.	Yes	Yes	Yes	Yes
Resize Window to Fit command	Window fills screen, image is zoomed to fill window.	Yes	Yes	No	Yes
Reveal Location command	Choose a file in File Browser, view file in Finder window.	Yes	No	No	No
Revert command	Returns to last-saved version; all changes and modifications since that point will be lost.	Yes	Yes	Yes	Yes
RGB color model	An additive color mode consisting of Red, Green, and Blue values with a bit depth of 24 bits; able to produce 16.7 million colors.	Yes	Yes	Yes	Yes
Rotate Canvas command	Rotates image (canvas) in 90-degree steps, by user-input angle, or by flipping horizontally or vertically.	Yes	Yes	Yes	Yes
Roundness option	Ratio of height and width of brush tip shape.	Yes	Yes	Yes	No
Rulers	Rulers along top and left edge of the window; user-changeable units of measurement.	Yes	Yes	Yes	Yes
Run Length Encoding (RLE) compression	A lossless compression method; reduces files to approximately 75% of original size; works best with images containing large areas of the same color.	Yes	Yes	Yes	Yes
Save Palette Locations option	Palettes will remain in same position from one session to the next unless this option is deselected.	Yes	Yes	No	No
Save Path command	Any open or closed path can be saved in the Paths palette for use later.	Yes	No	Yes	No
Save Selection command	A selection can be saved as an alpha channel or as an addition to an existing channel.	Yes	No	Yes	Yes
Scale Effects command	Rescale layer effects for a repurposed/resized image.	Yes	No	No	No

Continued

Table A-3 *(continued)*					
Task/Tool	*Description*	*PS7*	*PE*	*PP10*	*PSP7*
Scaling layer styles	Rescale layer effects for a repurposed/ resized image.	Yes	No	No	No
Selective color table	A color table that favors the preservation of Web colors; good color integrity.	Yes	Yes	Yes	No
Send Backward command	Moves a layer down one level in the stacking order.	Yes	Yes	Yes	Yes
Send to Back command	Moves a layer to the bottom of the stacking order (above Background layer).	Yes	Yes	Yes	Yes
Sepia-tone images	Use Channel Mixer to combine two channels.	Yes	No	No	Yes
Settings menu	Used to save and recall Optimization settings for Web images.	Yes	No	No	No
Shape layers	Using a Shape tool or Pen tool, a closed shape is filled with foreground color; shape's outline is saved as vector mask linked to layer.	Yes	Yes	No	Yes
Snap command	Used to snap edges of selections, text blocks, marquees, slices and shapes to guides or grid for precise alignment.	Yes	No	Yes	Yes
Snapshot command	Creates an interim image of the document at its present state that can be used as a backup, or in conjunction with History Brush or Art History Brush.	Yes	No	No	No
Soft proofs	An on-screen approximation of how the image will appear under specific printing conditions.	Yes	No	No	No
Sort by Hue command	Sorts the colors in a color table by hue.	Yes	No	No	Yes
Sort by Luminance command	Sorts the colors in a color table by the lightness or brightness of a color.	Yes	No	No	Yes
Sort by Popularity command	Sorts the colors in a color table by the color's frequency of use in the image.	Yes	No	No	Yes
Split Channels command	A flattened file can be split into separate channels for each color that become separate grayscale documents; used when converting to file format that does not preserve channels.	Yes	No	Yes	Yes

Task/Tool	Description	PS7	PE	PP10	PSP7
Spot channels	A channel used to print a spot color.	Yes	No	Yes	Yes
Spot colors	Spot colors are solid ink colors instead of process colors made up of a combination of inks.	Yes	No	Yes	Yes
Stroke command	Specifies width and color of border for selection or layer.	Yes	Yes	Yes	Yes
Stylus tablet	Program compatibility with pressure-sensitive digital tablet.	Yes	Yes	Yes	Yes
Subtract from Channel option	In saving a selection to an existing channel, this option removes the selection from the existing channel.	Yes	No	No	No
Subtract option	A channel blending mode where pixel values from source channel are subtracted from the target channel's pixels, then divided by Scale factor and added to Offset value.	Yes	No	No	No
Swatches	A library of colors in a floating palette.	Yes	Yes	Yes	Yes
TIFF format	Tagged Information File Format, a bitmap image format supported by most applications; preferred for images destined for commercial printing.	Yes	Yes	Yes	Yes
Tonal range adjustment layers	A means to experiment with tonal changes in an image on a layer that can be deleted instead of on the image itself.	Yes	Yes	Yes	Yes
Tool tips	Verbal tabs naming the tool and providing keyboard shortcut, if any.	Yes	Yes	Yes	Yes
TOYO colors	A library of more than 1,000 colors used in Japanese commercial printing.	Yes	No	Yes	Yes
Trap command	Used in CMYK printing; colors overlap by choking or spreading in order to negate press misregistration resulting in white gaps around objects.	Yes	No	Yes	Yes
Tritones	Similar to Duotones or Quadtones; three colors of ink are used to create a special colored effect.	Yes	No	Yes	Yes
Undo command	Allows user to correct a mistake; takes image back one step.	Yes	Yes	Yes	Yes

Continued

Table A-3 *(continued)*					
Task/Tool	*Description*	*PS7*	*PE*	*PP10*	*PSP7*
Ungroup command	Releases objects that have been grouped together for manipulation.	Yes	Yes	Yes	Yes
Unsharp Mask filter	A method of sharpening the appearance of an image by changing edge pixel colors to increase edge contrast.	Yes	Yes	Yes	Yes
Unshift All Colors command	When colors have been shifted to Web-safe colors, this command shifts the colors back to their original values.	Yes	No	No	No
Use Accurate Screens option	Allows program to select halftone screen angles and frequencies for PostScript Level 2 and higher printers.	Yes	No	No	No
Use All Layers option	Allows Magic Wand to select pixels from visible image instead of just the selected layer.	Yes	Yes	No	No
Use Pixel Doubling	To speed up display (screen redraw), this option temporarily doubles the size of pixels as the image is being drawn; no effect on image pixels.	Yes	No	No	No
Varnish	An entry of 0% in the Solidity field simulates a transparent ink such as a varnish; allows on-screen approximation of spot varnish.	Yes	No	No	No
Vector artwork	Resolution-independent artwork defined by mathematical objects called vectors; must be rasterized before editing in these programs.	Yes	Yes	Yes	Yes
Watermarks	Digital code created as noise is added to the image for copyright information.	Yes	Yes	Yes	Yes
Windows Color Picker	An alternative color picker to the ones provided by the programs.	Yes	Yes	Yes	Yes
Workspaces, customizing	Personalized layout and arrangement of palettes and panels.	Yes	No	Yes	Yes
XOR mode	Allows selection of multiple areas in an image; overlapping areas combine.	Yes	No	Yes	No
Zero origin	Move the Zero Point of the image from top right to different location.	Yes	No	Yes	No

Table A-4
Tools

Task/Tool	Description	PS7	PE	PP10	PSP7
Airbrush tool	Applies gradual tones of color, simulating traditional airbrush effects.	Yes	Yes	Yes	Yes
Art History Brush options	Paint previous state of image into new layer using custom brushes.	Yes	No	No	No
Blur tool	A brush for softening particular areas while leaving rest of image sharp.	Yes	Yes	No	No
Brush tool	By default, a soft-edged tool that applies the foreground color.	Yes	Yes	Yes	Yes
Brushes, color dynamics	Control how the color changes as the stroke continues.	Yes	No	No	No
Brushes, dual	Allow mixing of two brush styles for unique brush strokes.	Yes	No	No	No
Brushes, noise	Add random noise to brush strokes.	Yes	No	No	No
Brushes, scattering	Allow control over the number and placement of marks in a stroke.	Yes	No	No	No
Brushes, shape dynamics	Allow changing elements to preset and custom brushes.	Yes	No	No	No
Brushes, texture	Allow addition of texture to brush stroke.	Yes	No	No	No
Brushes, wet edges	Add paint build-up appearance to edge of brush stroke.	Yes	No	No	No
Burn tool	Darkens specific areas of the image with a brush.	Yes	Yes	Yes	No
Clone Stamp tool	Paints from a sampled selection, known as Rubber Stamp tool.	Yes	Yes	Yes	Yes
Custom Shape tool	Automatically draws vector objects that can be resized and modified independent of resolution; may be used as selection outlines.	Yes	Yes	No	Yes
Detection width, Lasso tool	Adjustable diameter for Magnetic Lasso tool.	Yes	Yes	No	No
Dodge tool	Lightens specific areas of the image with a brush.	Yes	Yes	Yes	No
Dolly Camera option	A 3-D tool used to zoom in or out on an image.	Yes	Yes	No	No

Continued

Table A-4 *(continued)*					
Task/Tool	*Description*	*PS7*	*PE*	*PP10*	*PSP7*
Edge sensitivity, Lasso tool	Adjustable sensitivity for Magnetic Lasso tool.	Yes	Yes	No	No
Eraser tool	Deletes pixels from layer, allowing lower layers or background to show.	Yes	Yes	Yes	Yes
Eyedropper tool	Allows selection of color sample; makes that the foreground color.	Yes	Yes	Yes	Yes
Fill tool	Fills selected area with foreground color; known as Paint Bucket tool.	Yes	Yes	Yes	Yes
Freeform Pen tool	Draws freehand lines, usually with hard edges; known as Pencil tool.	Yes	Yes	Yes	Yes
Gradient tools	Creates a blend of color from insertion point to end of mouse drag.	Yes	Yes	Yes	Yes
Hand tool	Allows user to move entire contents of window around screen.	Yes	Yes	Yes	Yes
Healing Brush tool	Used for small area touch-up; repairs image, leaving texture and color intact.	Yes	No	No	No
History Brush tool	Paints previous state of image into new layer.	Yes	No	No	No
Line tool	Draws straight lines, usually hard-edged.	Yes	Yes	Yes	Yes
Magic Eraser tool	Selects pixels like Clone Stamp, erasing them to background or transparency; can select contiguous pixels, or similar pixels.	Yes	Yes	No	No
Magic Wand tool	Selects all contiguous pixels within color tolerance level.	Yes	Yes	Yes	Yes
Magnetic Lasso tool	Creates selection based on edge contrast.	Yes	Yes	No	No
Magnetic Pen tool	Creates vector path based on edge contrast.	Yes	No	No	No
Marquee tools	Rectangular and elliptical selection tools.	Yes	Yes	Yes	Yes
Measuring tool	Tool that measures length, height, or angle.	Yes	No	No	No
Paint Bucket tool	Fills selected area with foreground color; known as Fill tool.	Yes	Yes	Yes	Yes
Paintbrush tool	By default, a soft-edged tool that applies the foreground color.	Yes	Yes	Yes	Yes

Task/Tool	Description	PS7	PE	PP10	PSP7
Pan camera tool	A 3-D tool used to move objects within the page view.	Yes	Yes	No	No
Patch tool	Used for large area touch-up; repairs image, leaving texture and color intact.	Yes	No	No	No
Pattern stamp tool	Paints a custom or library pattern using a brush shape.	Yes	Yes	No	No
Pencil tool	Draws freehand lines, usually with hard edges; known as Pencil tool.	Yes	Yes	Yes	Yes
Polygon Lasso tool	Creates straight edged selection with rubber band action.	Yes	Yes	No	Yes
Polygon tool	Draws multiple-sided vector objects that can be filled, stroked, or used as selections.	Yes	Yes	Yes	Yes
Rectangle tool	Draws rectangular-shaped vector objects that can be filled, stroked, or used as selections.	Yes	Yes	Yes	Yes
Reflected gradient tool	Symmetric linear gradient on both sides of the insertion point.	Yes	Yes	No	Yes
Rounded Rectangle tool	Draws rectangular-shaped vector objects with round corners that can be filled, stroked, or used as selections.	Yes	No	No	No
Shape tools	Automatically draw vector objects that can be resized and modified independent of resolution; may be used as selection outlines.	Yes	Yes	No	Yes
Sharpen tool	A brush for sharpening particular areas while leaving rest of image soft.	Yes	Yes	No	No
Single Column Marquee tool	Selects vertical single-pixel marquee.	Yes	No	No	No
Single Row Marquee tool	Selects horizontal single-pixel marquee.	Yes	No	No	No
Smudge tool	Smears foreground color as if a finger were smeared through wet paint.	Yes	Yes	Yes	No
Sponge tool	Desaturates particular areas of the image while leaving rest of image alone.	Yes	Yes	No	No
Zoom tool	Enlarges or reduces view of image in window.	Yes	Yes	Yes	Yes

Table A-5 **Type**					
Task/Tool	*Description*	*PS7*	*PE*	*PP10*	*PSP7*
All Caps command	Button-click changes selected text to upper case letters.	Yes	No	No	No
Asian type	Options are available for working with Asian double-byte font characters.	Yes	Yes	No	No
Baseline Shift	Shift characters vertically within line of text.	Yes	No	No	No
Character palette	Palette containing options for font characters.	Yes	No	No	No
Check Spelling command	Spell-checks text after it is entered into the document.	Yes	No	No	No
Chinese type	Options are available for working with Asian double-byte font characters.	Yes	No	No	No
CJK type (Chinese, Japanese, Korean)	Options are available for working with Asian double-byte font characters.	Yes	No	No	No
Convert to Paragraph Text command	Converts input text to a text block that allows text flow adjustment.	Yes	No	No	No
Convert to Point Text command	Converts paragraphs of text to separate lines of text.	Yes	No	No	No
Create Work Path command for type	Converts text into vector path selections that can be modified, but not edited as text.	Yes	No	No	No
Hanging punctuation	Allows punctuation marks to be outside left or right margins.	Yes	No	No	No
Horizontal scaling of type	Allows text to be compressed or expanded horizontally.	Yes	No	No	No
Hyphenating type	Automatically breaks words at syllables.	Yes	No	No	No
Indenting paragraphs	Indent first line of text for greater readability or design function.	Yes	No	No	No
Japanese type	Options are available for working with Asian double-byte font characters.	Yes	No	No	No
Justifying type	Text is flush on right and left margins.	Yes	No	No	No
Kerning type	Adjusts space between individual characters.	Yes	No	Yes	Yes

Task/Tool	Description	PS7	PE	PP10	PSP7
Korean Type	Options are available for working with Asian double-byte font characters.	Yes	No	No	No
Leading	Adjusts space between lines of text.	Yes	No	Yes	Yes
Rotating type characters	Vertical type can be rotated 90 degrees. Rotated characters are upright; non-rotated characters are sideways.	Yes	No	No	No
Subscript type	Type reduced in size and lowered below the baseline.	Yes	No	No	No
Superscript type	Type reduced in size and raised above the baseline.	Yes	No	No	No
Text Selection command	Text tool that creates vector selections in shape of font characters that can be edited, blended, or otherwise modified.	Yes	No	No	No
Vertical scaling of type	Allows text to be compressed or expanded vertically.	Yes	No	No	No
Warp Text command	Distorts all characters on a type layer into a variety of warp styles.	Yes	Yes	No	No

Table A-6
Web and Animation

Task/Tool	Description	PS7	PE	PP10	PSP7
Animated GIFs	A sequence of still frames in GIF format shown successively to create animation.	Yes	Yes	No	Yes
Auto Slices	Rectangular slices created by the program that account for areas not sliced by the user.	Yes	No	No	Yes
Bring Forward option for image maps	Used to move image map one level higher in the stacking order for easier manipulation.	Yes	No	No	No
Bring Forward option for slices	Used to move user slice to the top of the stacking order for easier manipulation.	Yes	No	No	No
Bring to Front option for image maps	Moves image map to top of stacking order for easier manipulation.	Yes	No	No	No
Bring to Front option for slices	Moves slice to top of stacking order for easier manipulation.	Yes	No	No	No

Continued

	Table A-6 *(continued)*				
Task/Tool	**Description**	**PS7**	**PE**	**PP10**	**PSP7**
Browsers, adding to Preview In menu	Allows user to add various Web browser formats for previewing images.	Yes	No	No	Yes
Browsers, previewing in	Allows user to view images in various Web browser formats.	Yes	No	No	Yes
Client-side image maps	Image maps interpreted by the browser without the need to contact the server.	Yes	No	No	No
Color palette, selecting Web-safe colors	Palette of 216 colors that will appear the same on all browsers.	Yes	Yes	No	Yes
Color tables, shifting to Web-safe colors	Color tables contain all the colors in an image. This command changes color table to reflect 216 Web-safe colors.	Yes	No	No	No
Copy State command	Copies a rollover state to paste into another state in same or different rollover.	Yes	No	No	No
Diffusion dither	A random dithering pattern that extends across adjacent pixels.	Yes	Yes	No	Yes
Dithering transparency	Allows dither pattern to melt seamlessly into background.	Yes	No	No	No
Dithering, Shifting to Web-safe colors	To prevent dithering, colors can be shifted to Web-safe colors instead.	Yes	Yes	No	Yes
Dithering, weighted optimization	Allows specific channels or masks to be dithered at different levels of optimization.	Yes	No	No	No
HTML, URLs in image maps	Add links from image maps to HTML and URLs.	Yes	No	No	No
HTML, URLs in slices	Add links from slices to HTML and URLs.	Yes	No	No	No
Image Map Visibility button	Allows user to see image map setup on original image.	Yes	No	No	No
Import Folder as Frames command	Files in a folder are converted into . animation frames in alphabetical file name order	Yes	No	No	No
Interlace option for GIFs and PNG-8	A non-interlaced image downloads one line at a time, starting at the top; an interlaced image is loaded in steps, with more detail added at each step.	Yes	Yes	Yes	Yes

Task/Tool	Description	PS7	PE	PP10	PSP7
Make Frames From Layers command	Converts layers into animation frames in stacking order of layers.	Yes	No	No	No
Matte option	Allows user to choose a background (matte) color for GIF images.	Yes	No	Yes	Yes
Matting command	Deletes fringe colors resulting from image removed from background.	Yes	No	Yes	Yes
Modify Lossiness setting	Adjusts the amount of detail lost due to file size reduction.	Yes	Yes	Yes	No
Modify Quality setting	Adjusts the quality of JPEG files.	Yes	Yes	Yes	No
Optimize palette	Allows user to set up several options for image optimization.	Yes	No	No	Yes
Optimize to File Size option	Options to select file size as criteria for optimizations.	Yes	No	No	Yes
Promote Layer Based Image Map Area command	Layer-based image maps are tied to the pixel content of the layer. To edit the image map, it must be converted to a tool-based image map through this command.	Yes	No	No	No
Promote to User-Slice command	Converts auto-slice to user slice for adjustment or optimization.	Yes	No	No	No
QuickTime movies, opening animations	Open and edit QuickTime movies in MOV, AVI, and FLIC formats.	Yes	No	No	No
QuickTime movies, saving as	Save animations that can be viewed in QuickTime and opened in other applications that support QuickTime.	Yes	No	No	No
Reverse Frames command	Inverts order of frames in an animation.	Yes	No	No	Yes
Rollover Preview button	Preview action of rollover button.	Yes	No	No	No
Rollovers palette	Palette of rollover options.	Yes	No	No	No
Save for Web command	Opens panel to optimize images for the Web.	Yes	Yes	No	No
Send Backward option, image maps/slices	Used to move image map one level lower in the stacking order for easier manipulation.	Yes	No	No	No

Continued

Table A-6 *(continued)*					
Task/Tool	*Description*	*PS7*	*PE*	*PP10*	*PSP7*
Send to Back option, image maps/slices	Used to move user slice to the bottom level of the stacking order for easier manipulation.	Yes	No	No	No
Size/download Time option	Compare file size to download times at various modem speeds.	Yes	No	No	Yes
Transparency, dithering	Dither partially transparent pixels.	Yes	No	No	No
Transparency, from mask	Masks painted with gray create semi-transparent to transparent areas.	Yes	No	No	No
Transparency, gradients	Masks with gradients apply full effect when dark, lowest effect when light (by default).	Yes	No	No	No
Transparency, optimizing	Allows user several options for making a seamless fit of an image into a background.	Yes	No	No	No
URLs, assigned to image maps/slices	Add links from image maps and slices to HTML and URLs.	Yes	No	No	No
WBMP format	Standard format for wireless devices such as cell phones.	Yes	No	No	No
Web Shift/ Unshift Selected Colors command	Changes normal colors to Web-safe palette, or Web-safe colors to normal color table.	Yes	No	No	No
Web, creating photo galleries	Automatically create code and images for Web-based photo gallery.	Yes	No	No	No

✦   ✦   ✦

What's on the CD-ROM?

This appendix provides you with information on the contents of the CD that accompanies this book. For the latest and greatest information, please refer to the ReadMe file located at the root of the CD. Here is what you will find:

✦ System Requirements

✦ Using the CD with Windows and Macintosh

✦ What's on the CD

✦ Troubleshooting

System Requirements

Make sure that your computer meets the minimum system requirements listed in this section. If your computer doesn't match up to most of these requirements, you may have a problem using the contents of the CD.

For Windows 9*x*, Windows 2000, Windows NT4 (with SP 4 or later), Windows Me, or Windows XP:

✦ PC with a Pentium processor running at 120 Mhz or faster

✦ At least 32MB of total RAM installed on your computer; for best performance, at least 64MB is recommend

✦ Ethernet network interface card (NIC) or modem with a speed of at least 28,800 bps

✦ A CD-ROM drive

✦ A computer capable of running image-editing software, such as Adobe Photoshop, is highly recommended, although you can use the CD without it

✦ A true-color capable monitor is helpful if you want to see all the information on screen.

✦ At least 32MB of total RAM installed on your computer; for best performance in photo editing, 512MB or more is recommended.

For Macintosh:

✦ Mac OS computer with a 68040 or faster processor running OS 7.6 or later, though System 9.1 or later is highly recommended for running the included versions of Adobe Photoshop and Photoshop Elements and some of the other example software available on the CD.

✦ At least 32MB of total RAM installed on your computer; for best performance in photo editing, 512MB or more is recommended.

Using the CD with Windows

To install the items from the CD to your hard drive, follow these steps:

1. Insert the CD into your computer's CD-ROM drive.

2. A window appears with the following options: Install, Explore, eBook, Links, and Exit.

Examples: Open these as you would any standard image file on any disk drive attached to your computer.

Explore: Allows you to view the contents of the CD-ROM in its directory structure.

eBook: Allows you to view an electronic version of the book.

Links: Opens a hyperlinked page of Web sites.

Exit: Closes the autorun window.

Examples:

If you do not have autorun enabled or if the autorun window does not appear, follow the steps below to access the CD:

1. Click Start ⇨ Run.

2. In the dialog box that appears, type *d*:\setup.exe**, where *d* is the letter of your CD-ROM drive.**

This will bring up the autorun window.

3. Choose the Examples, Explore, eBook, Links, or Exit option from the menu.

See Step 2 in the preceding list for a description of these options.

Using the CD with the Mac OS

To install the items from the CD to your hard drive, follow these steps:

1. **Insert the CD into your CD-ROM drive.**
2. **Double-click the icon for the CD after it appears on the desktop.**
3. **Most programs come with installers; for those, simply open the program's folder on the CD and double-click the Install or Installer icon.**

   Note: To install some programs, just drag the program's folder from the CD window and drop it on your hard drive icon.

If you need to open an image file for reference or to use in an exercise, simply navigate to the folder called Author.

What's on the CD

The following sections provide a summary of the software and other materials you'll find on the CD.

Author-created materials

All author-created material from the book, including code listings and samples, are on the CD in the folder named Author.

You will know when the book references one of these files because I've simply said, "from the book's CD, open whatever.tif."

Applications

The following applications are on the CD:

ACDSee 4.0 from ACDSee Systems (www.acdsystems.com)

This image-management software is similar to the Browser feature in the latest versions of the Adobe Photoshop products. Files are shown as large thumbnails and you can acquire, view, organize, enhance, print, and share your images on the Internet quickly. This version of the program is a free trial, limited time, full-featured, Windows-only version.

Adobe Photoshop 7 from Adobe Systems (www.adobe.com)

Photoshop is the defacto standard in professional-level image editing software. This program includes such advanced features as scripting, Actions macros, the new and miraculous Healing Brush, a CMYK color mode for pre-press work, and so many advanced features that one can almost always find multiple ways of meeting just about any image editing requirement. The tryout software included on the CD lets you experiment with the interface and commands, but you can't save or print files. This program can be used with Macintosh and Windows.

Adobe Photoshop Elements 6.0 from Adobe Systems (`www.adobe.com`)

This is a very affordable version of the classic image editor aimed especially at those who must complete serious image editing tasks that are capable of meeting most business requirements but who do not intend to do their own pre-press work and who do not have heavy production demands. Photoshop Elements is a nearly perfect training ground for those who might want to move up to Photoshop. At the same time, many of the most often-needed tasks have been either minimized to a single button-click or the dragging of an icon onto the image. Numerous "recipes" coach you through every step of more complicated processes. The tryout software included on the CD lets you experiment with the interface and commands, but you can't save or print files. This program can be used with Macintosh and Windows.

Paint Shop Pro 7, from JASC Software Inc. (`www.jasc.com`)

This image editor is popular, functional, and also happens to be very affordable. Paint Shop Pro is compatible with Adobe Photoshop plug-ins. The trial version runs for 30 days, is fully functional, but is a Windows only application.

Quantum Mechanics Pro from Camera Bits (`www.camerabits.com`)

This highly sophisticated Photoshop-compatible plug-in is used to reduce digital camera noise. The trial demo works for 20 uses before you must register. This program can be used with Macintosh and Windows.

S-Spline Image Enlargement from Shortcut (`www.s-spline.com`)

This plug-in specializes in the ability to enlarge images while maintaining edge sharpness. S-Spline Image Enlargement is in hot competition with PrintShop Pro and is less dependent on having at least two megabytes of data in the original image. The trial version on this CD lasts for 20 uses or two weeks, whichever comes first. This plug-in can be used with Macintosh and Windows.

Andromeda Photographic effects sample filters from Andromeda Software, Inc. (`www.andromeda.com`)

Andromeda makes several filters that are especially useful for curing lens aberrations as well as re-created some of the effects from special effects filters. The following filters are included:

✦ **Scatter Light:** A set of four different highlight scattering effects for creating "glamour" effects. Filters of this type are the most versatile and effective that I've seen yet. If you're a wedding, portrait, or fashion photographer, you'd best look into this one. Fully functional time-limited trial version. (These filters can be used with Macintosh and Windows.)

✦ **VariFocus:** Especially made to focus interest on the subject by blurring the foreground and background. Imitates the effect of using a larger format camera at wide apertures to force shallow depth-of-field. (These filters can be used with Macintosh and Windows.)

✦ **LensDoc:** A fully functional demo of the best way available for correcting various types of lens distortion that are especially prevalent when using under-$1,000 zoom-lens equipped digital cameras. Corrects barreling, pincushioning, perspective, and rotational distortions. (These filters can be used with Macintosh and Windows.)

✦ **Perspective:** You can correct or change perspective of either images or type as though the image were being rotated in 3D space.

✦ **Velociraptor:** This amazing set of motion blurs from Andromeda, Inc. (`www. andromeda.com`) can be made to follow the subject, comic-book style. Various styles arc, bounce, cascade, converge, curve, decline, diminish, jolt, jitter, loop, spiral, spring, streak, trail, or wave. This is a fully functional, time-limited trial version. This program can be used with Macintosh and Windows.

Camera Bits Quantum Mechanics Lite from Camera Bits (`www.camerabits.com`)

This application removes noise and artifacts from digital camera images and scans. It also includes such features as sharpening and auto-contrast controls, a large and enhanced preview, and 48-bit support for Photoshop 5+.

Fireworks MX from Macromedia, Inc. (`www.macromedia.com/software/ fireworks/`)

This is a very advanced Web graphics optimizer and editor (both bitmap and vector) that allows you to interactively create JavaScript Web navigation and interactive graphics through built-in XML language generators. If you are working with Flash or Dreamweaver, the interface will feel quite compatible and familiar.

Acrobat Reader 5.0 from Adobe, Inc. (`www.adobe.com/products/acrobat/`)

Acrobat Reader is a freeware browser plug-in and utility that enables you to read any typeset and layout-formatted document that has been saved in Adobe's PDF (portable document file) format. It is especially interesting to digital camera users because, in conjunction with Adobe's Photoshop Elements, you can automatically create slideshows that can be shown on any platform, including Palm and Pocket PC handhelds.

Xenofex 1, Splat! 1.0, and Eye Candy 4000 from Alien Skin Software (`www.alienskin.com`)

All three of these are advanced Photoshop-compatible filter sets with very versatile user interfaces:

✦ Eye Candy consists of 23 different filters such as Chrome, Fire, Smoke, and Wood.

✦ Splat uses the same interface, but the filters are more utilitarian (for example, frames, textures, edges, borders, mosaics).

✦ Xenofex consists of 16 filters that imitate natural phenomena and create strange distortions.

Flaming Pear Sample filters from Flaming Pear Software (`www.flamingpear.com`)

Flaming Pear makes more than a dozen sets of filters, including SuperBlade Pro—one of the most highly respected filters for creating text effects, which also creates all sorts of surface textures.

GraphicConverter 4.2.1 from Lemke Software (`lemkesoft.com/us`)

This is a Macintosh shareware program that works on all versions of the Mac OS prior to OS X. At this writing, the OS X version is promised "any day now." This is a very capable low-cost image editor for the Mac. As you'd guess by the name, its forte is the ability to convert graphics from one file format to another. It imports about 160 graphics formats and exports to about 45. This program also supports AppleScript, so you can automate batch conversion of files.

Shareware programs are fully functional, trial versions of copyrighted programs. If you like particular programs, register with the authors for a nominal fee and receive licenses, enhanced versions, and technical support. *Freeware programs* are copyrighted games, applications, and utilities that are free for personal use. Unlike shareware, these programs do not require a fee or provide technical support. *GNU software* is governed by its own license, which is included inside the folder of the GNU product. See the GNU license for more details.

Trial, demo, or *evaluation versions* are usually limited either by time or functionality (such as being unable to save projects). Some trial versions are very sensitive to system date changes. If you alter your computer's date, the programs will "time out" and will no longer be functional.

eBook version of Digital Photography Bible, 2nd Edition

The complete text of this book is on the CD in Adobe's Portable Document Format (PDF). You can read and search through the file with the Adobe Acrobat Reader (also included on the CD). If you don't have Acrobat Reader installed, double-click its icon on the CD and follow the brief and easy instructions that follow. After the reader is installed, you see the Acrobat PDF icon on the CD's directory. Double-click the icon for this book, appropriately called Digital Photography Bible, and the book will open. You can then reference any page right on your computer or laptop.

Troubleshooting

If you have difficulty installing or using any of the materials on the companion CD, try the following solutions:

✦ **Turn off any antivirus software that you may have running.** Installers sometimes mimic virus activity and can make your computer incorrectly believe that it is being infected by a virus. (Be sure to turn the antivirus software back on later.)

✦ **Close all running programs.** The more programs you're running, the less memory is available to other programs. Installers also typically update files and programs; if you keep other programs running, installation may not work properly.

✦ **Reference the ReadMe.** Please refer to the ReadMe file located at the root of the CD-ROM for the latest product information at the time of publication.

If you still have trouble with the CD, please call the Customer Care phone number: (800) 762-2974. Outside the United States, call 1 (317) 572-3994. You can also contact Customer Service by e-mail at `techsupdum@wiley.com`. Wiley Publishing will provide technical support only for installation and other general quality control items; for technical support on the applications themselves, consult the program's vendor or author.

✦   ✦   ✦

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Information on the Web

Books

The following are Web resources for books about digital photography and related sources. Web bookstores can be especially good for finding books on specialized and esoteric topics.

Amazon.com

P.O. Box 81226
Seattle, Washington 98108-1226

800-201-7575

`www.amazon.com`

Amazon.com is recognized as the leader in online booksellers. They have an extensive list of books relating to digital photography, computer graphics, and other related subjects. Its service is excellent, and often offers used books that are significantly cheaper than new books, so if you don't care about pristine quality, save some money.

Barnes & Noble

800-843-2665

`www.barnesandnoble.com`

This is the other leading online bookstore. It's always a good idea to check the major online services for the same titles because prices can sometimes vary quite a bit. Barnes & Noble is currently allied with Amazon.

Digital Camera Depot

```
www.digitalcameradepot.com
orders@amazon.com
```

This is a good general-purpose hardware site, offering reviews, comparisons, discussion forums, and — because it's associated with Amazon.com — a decent book section. In fact, Amazon handles the orders, so you can depend on the reliability.

Megabyte Books

18-19 Aldgate Barrs Shopping Centre
London
E1 7PJ

+44 (0)1392 420945

```
www.megabytebooks.com
```

This online bookshop claims in big letters to be cheaper than everyone. It has a decent selection of books on digital photography.

PhotoSecrets

PhotoSecrets Publishing
9582 Vista Tercera
San Diego CA 92129-2737

858-780-9726

```
www.photosecrets.com
hello@photosecrets.com
```

This site offers hundreds of photo guides and a nice book section and is a must-see for the photographer that likes to travel.

The Designers' Bookshelf

15 SouthGate
Harrisonburg, VA 22801

540-433-8402

```
www.design-bookshelf.com/Photography/
Showker@Graphic-Design.net
```

The Designers' Bookshelf is an affiliate of The Graphic Design Network and has been referred to as "the Yahoo for books on design and visual communications." The focus is a book listing for designers, photographers, and graphic artists, which beats having to search through the big sites for the right book. This site also features a separate section on digital photography.

Short Courses Publishing

Dennis P. Curtin
16 Preston Beach Road
Marblehead, MA 01945

781-631-1178

www.shortcourses.com
denny@shortcourses.com

This site is an absolute treasure trove of information and useful guides. Dennis Curtin has put together a collection of books and guides that can inform you about every aspect of digital photography from general topics to camera-specific courses. This is a must-have on your bookmark list.

Education

The following sites specialize in teaching photography or digital photography — or at least do some teaching on the side. Some even give full online courses for credit.

Digital Studio

www.digitalstudio.ucr.edu
ted.fisher@ucr.edu

This site showcases young people and adults participating in computer-based creative expression through hands-on access to new imaging technologies.

FunPhoto.com

www.funphoto.com
learn@armstrongward.com

This site features a photography and digital painting gallery, resources, and tutorials.

Graphic Intelligence Agency, Inc.

4040 Embassy Parkway, Suite 370
Akron, OH 44333

888-439-4403

www.graphintel.com

The Graphic Intelligence Agency is attempting to make graphic output easier for the corporate world. The agency hosts seminars on everything from printing technology to Photoshop and scanning. The agency was founded to lessen the information gap for the graphic professional.

Jasc Software

www.jasc.com/digitalphoto.asp

Jasc, a leading developer of image-editing software like Paintshop Pro, offers up a bunch of good tutorials on digital techniques. The tutorials cover a wide variety of digital subjects, are well illustrated, and are easy to follow.

Kodak Digital Learning Center

800-235-6325

www.kodak.com/US/en/digital/dlc

Kodak has always been a leader and an innovator in photographic technology. The Digital Learning Center is no exception and comes with Kodak's consistent high quality. It covers a broad range of subject matter designed to enlighten anyone about digital imaging. This site features how-tos, technical explanations, courses, reference, and projects — all of which are nicely laid out and illustrated.

New York Institute of Photography

211 East 43rd Street, Dept. WWW
New York, NY 10017 U.S.A.

212-867-8260
Fax: 212-867-8122

www.nyip.com
info@nyip.com

This site is sponsored by the New York Institute of Photography, a school founded in 1910. The free site provides tips, articles, and contests designed to enhance photographic capabilities. They regularly feature a section on digital photography.

Oklahoma School of Photography

(405) 799-1411

www.photocareers.com
osop1@okc.oklahoma.net

This vocational photography school is recognized by the Department of Education as a nationally accredited school offering training in professional photography and graphic/digital imaging. The school has been in operation since 1972, and in 1997, the school diversified its training even more by opening a course in Digital Imaging. This course trains people in the many arts of digital imaging, including advertising, layout and design, desktop publishing, graphic design, computerized fine art, image manipulation, photographic restoration, and much more.

Olympus Digital Photoschool

800-622-6372 ext. 6161

www.olympusamerica.com/cpg_section/cpg_photoschool.asp
photoschool@olympus.com

Olympus, the leader in digital cameras, has recently launched the Olympus School of Digital Photography, a one-day workshop covering the entire digital process from image acquisition to final output.

Photographic Society of America Electronic Imaging Division

psa-eid.org
admin@psa-eid.org

The Photographic Society of America is a nonprofit organization with more than 6,000 members. The organization was established to be a medium for cooperative action in promoting the arts and sciences of photography and for furthering public education therein. PSA provides members with an opportunity to participate in a multitude of services and activities. The site also includes a member exhibition gallery of digital images.

Photoshop for Photographers

www.bbdigital.co.uk
barry@bbdigital.co.uk

This site, produced by Barry Beckham (digital photographer and founder of IDIG—Internet Digital Imaging Group), contains a lot of useful information. It includes some good tutorials on image editing—both online and on CD, articles, and a question and answer section, just to name a few. The site also features some interesting digital galleries as well.

Short Courses Publishing

Dennis P. Curtin
16 Preston Beach Road
Marblehead, MA 01945

781-631-1178

www.shortcourses.com
denny@shortcourses.com

This site is an absolute treasure trove of information and useful guides. Dennis Curtin has put together a collection of books and guides that can inform you about every aspect of digital photography from general topics to camera-specific courses. This is a must-have on your bookmark list.

TutorialFind

www.tutorialfind.com/tutorials/artscrafts/photography/
taryn@find.com.au

This site specializes in tutorials of all sorts, including a few tutorials on digital imaging.

World Wide Learn Company

Suite 4, 2521 - 17th Avenue SW
Calgary, Alberta, Canada T3E 0A2

403-686-6162 Direct MST
Fax: 775-239-7197

www.worldwidelearn.com/photography-courses.htm
info@worldwidelearn.com

This site has a wide range of general descriptions and references for online courses, including many for general and digital photography and image editing. You can learn how to take better pictures and use your digital camera with these online photography courses, workshops, and tutorials.

Exhibitions, Shows, and Contests

This section is a bit of a mish-mosh, showcasing a little of this and a little of that. In fact, maybe I should have called it "places to network." These are places where people meet to eat, drink, and sleep digital photography. Some are digital photography exhibitions; many are trade shows that also feature exhibitions of digital artwork.

Bradley University Annual Digital Photography Exhibition

Bradley University
1501 W. Bradley Avenue
Peoria, IL 61625

309-677-3332

www.bradley.edu/exhibit95
rowe@bradley.edu

This site features galleries displaying digital photographers from their annual exhibitions from 1994. Each year has its own theme and the photos are nicely displayed; a visual feast.

Consumer Electronics Show

703-907-7600

www.cesweb.org

The Consumer Electronics Show in Las Vegas has become one of the two leading trade shows for introductions relating to digital photography. The show takes place in Las Vegas in the week of January 6-9. This Web site is an excellent resource for learning about the latest announcements, contacting manufacturers, and reading keynote addresses. This is also a great resource for finding contact information for companies in the electronics industry.

Macworld Expo

www.macworldexpo.com

This Web site is dedicated to the largest Macintosh-oriented trade show; it is an excellent resource for locating manufacturers of products related to digital photography and the Macintosh, though not all participating manufacturers link to their Web sites. This is also the place to look for upcoming show dates in San Francisco and New York. You can register online for upcoming shows and read descriptions of conferences and workshops. Although this is a Mac-centric event, you can also find a heavy focus on graphics and publication at this show. The great majority of products are cross-platform, so Windows users can find a great deal of information here, too.

Seybold Seminars

303 Vintage Park Drive
Foster City, CA 94404-1138

800-472-3976
650-578-6900

www.seyboldseminars.com

The Seybold Seminars are trade shows that occur principally in San Francisco and New York. This Web site is a valuable source of late-breaking news concerning many phases of the digital imaging industry — especially developments concerning prepress and publishing.

Galleries and Photo Sharing

These sites are mostly personal online galleries. Go to these and you'll probably find links to several hundred others. If you're really interested in learning to make great photos, you can't go wrong looking at the work of others.

A Different View Photography and Collage

dustylens.com
steve@dustylens.com

This site is a personal photographic portfolio of Steve and Bobbie Bingham, which also includes links and tips.

Black and White Digital Photos by Richard Saylor

members.aol.com/norcimmus/digital.htm
rlsaylor@ix.netcom.com

This site is a small gallery of black and white digital photography.

Carol Beckham — Digital Photographer

www.btinternet.com/~bbdigital/carols/
carol@cazbdigital.co.uk

This Web site is a showcase of this accomplished digital photographer's works.

Club Photo, Inc.

650 Saratoga Avenue
San Jose, CA 95129

408-557-6845

```
clubphoto.com
```

This site features online image sharing.

Computer Creative Network — Freeimages.com

```
www.freeimages.co.uk
admin@freeimages.co.uk
```

This site has a large database of free digital images; it's very user friendly and it really is free.

Danny Steyn — Photographer

2573 NE 26th Ave.
Ft Lauderdale, FL 33305

954-816-7272
Fax: 954-630-2657

```
www.dannysteyn.com/professional-photography-links.htm
info@dannysteyn.com
```

Danny Steyn is not a digital photographer, though he does do digital video production. I include his site because of its incredible links page.

Davro Digital Imaging

```
www.btinternet.com/%7Edavrodigital
david@davrodigital.co.uk
```

This is the personal site of David Rowley, an amateur photographer who uses image editing to enhance his photographs. He also has put together some nice tutorials on his techniques.

Digital Photographs by Steve Foote

```
www.stevefoote.net/index.htm
steve@stevefoote.net
```

A virtual gallery of decorative and surreal fine art photography by a master photographer. Visitors to the site can download free computer wallpaper or order signed original prints direct from the artist.

Eugenio Eoller — Photographer

```
www.eoller.com
eugenio.oller@terra.es
```

This site is a personal photographic portfolio with a focus on surrealism and digital manipulation.

Francine Chism Schwieder — Digital Photographer

```
www.tstonramp.com/~francine
francine×tonramp.com
```

This site features some interesting before and after photographs that this photographer has digitally manipulated.

IDIG Internet Digital Imaging Group

```
www.dabbles.co.uk/
barry@bbdigital.co.uk
```

This is an online club for digital photographers. The members have a database of over 2,000 photographs, and they are constantly contributing new images and techniques to share online and with others in the group.

Kleptography

```
www.kleptography.com
don@kleptography.com
```

This site a very nice digital photo gallery featuring digital photography by Don Ellis. The photographer also provides nice insights with good notes on all the shots.

PhotoServe — Visual Database

646-654-5789

```
www.pdnonline.com/photosource/portal
photoserve@pdnonline.com
```

This site is a database of photographers showing examples of their work; also includes an impressive array of digital photographers.

Robert Taylor — Digital Photographer

```
www.robtaylor.net
rob@robtaylor.net
```

This personal Web site features extensive galleries of photographs in various degrees of digital manipulation.

Tam's Digital Imaging — Digital Photographer

```
home.aeneas.net/~tamsdigital/Default.htm
tcstew@aeneas.net
```

This site showcases the photographer's experiments with various image-editing techniques and extensive gallery covering many subjects.

The Digital Arts Group

608 East J Street
Benicia, CA 94510

707-748-4396

```
www.digitalartsgroup.com
info@digitalartsgroup.com
```

This site features an in-depth gallery of over 50 of the world's best digital fine artists. It also has provocative articles on the state of digital art today.

ZoneZero

1333 Beverly Glen
Los Angeles, CA 90024

```
www.zonezero.com
```

This is an outstanding Web site for digital photography with excellent articles, provocative thoughts from leading digital photographers, and a definite Latin-American slant. The Webmaster is Pedro Mayer, an internationally recognized professional photographer.

Reference

These sites provide a wealth of information about various aspects of digital photography, with emphasis on techie and esoteric processes (for the most part).

All Digital Camera

```
www.alldigitalcamera.net
webmaster@alldigitalcamera.net
```

Just as the name implies, this site is all about digital cameras. The site also has an abundance of information in the form of reviews, news, how-to's, buyer guides, and where to shop guides. This site also features a forum.

Beyond Red

```
home.twcny.rr.com/scho/newpics/intro.html
scho@mac.com
```

This is a concise Web site devoted to infrared digital photography. The site features a gallery and a nice technical section that goes in-depth about the equipment and techniques used. The site also features a comparison gallery, which shows normal color versus infrared side-by-side, and many links to other Web resources on infrared photography.

Charles Daney's Photographic Pages

```
www.mbay.net/~cgd/photo/pholinks.htm
cgd@best.com
```

This site has many pages of useful links on regular and digital photography.

Charles Poynton

416-413-1377
Fax: 416-413-1378

```
www.inforamp.net/~poynton/notes/colour_and_gamma/ColorFAQ.html
www.inforamp.net/~poynton
poynton@poynton.com
```

This is an in-depth question and answer site that goes into great detail about digital color and other technical issues involved with digital imaging.

CNET Networks, Inc.

235 Second Street
San Francisco, CA 94105

```
www.cnet.com
```

This is one of the Web's largest information portals covering just about every subject, including digital photography. CNET boasts nice shopping guides with comparative pricing among the major brands. You will also find good reviews, advice, and current news. Another nice feature of CNET is the download section where you can find all sorts of free software, including camera drivers.

CoCam

```
www.cocam.co.uk/CoCamWS/Infrared/INFRARED.HTM
info@cocam.co.uk
```

This page has the title "Everything you wanted to know about infrared photography and were afraid to ask." Need I say more?

Digital Camera Buyers Guide

```
www.digital-camerastore.com
```

This site is strictly focused on digital cameras. It provides a quick and easy search system to locate a camera with your general feature requirements, a short education section, and a gallery where you can post some of your photographs.

Digital Camera Info

International Parkway
Plano, Texas 75093

```
www.digital-cameras-info.com
natol@digital-camera-info.com
```

This site has reviews, ratings, price comparisons, and expert reviews.

Digital Camera Resources

```
www.dcresource.com
jakeller@pair.com
```

This online reference site is dedicated to providing non-biased information about all brands of digital cameras. Their focus is mainly on consumer level cameras and not high-end professional models. They provide news, reviews, message boards, and a very good buyer's guide and search engine.

Digital Camera Reviews

Supreme Software Ltd.
PO Box 373
Walton on Thames, KT12 4BR, England

```
www.digital-camera-reviews.info/index.html
info@digital-camera-reviews.info
```

The name says it all—this is a site that can help you to choose just the right camera.

WEB INFO Digital Photography NOW

```
www.dp-now.com
feedback@dp-now.com
```

This site, sponsored by Olympus, features news, reviews, and advice about all aspects of consumer digital cameras, scanners, printers, software, and associated services.

Digital Photography Reference

```
jonespm2@shaw.ca
members.shaw.ca/jonespm2/PJDigPhot.htm
```

This site, developed by Peter Jones, is dedicated to providing information on how to select and understand digital cameras and accessories. This site features a lot of information, but you have to sort through many links to get to it all.

Digital Photography Reference Links

703-780-9033

```
www.pimall.com/nais/news/n.dv-links.html
webmaster@pimall.com
```

This site is an extensive list of reference links related to digital photography. Pimall also has the most complete collection of miniature digital cameras I have ever seen.

Digital Photography Review

```
www.dpreview.com
phil@askey.net
```

This excellent site contains digital photography and imaging news, reviews of the latest digital cameras and accessories, the most active discussion forums, a large selection of sample images, a digital camera buyer's guide, side-by-side comparisons, a comprehensive database of digital camera features and specifications, and a very detailed glossary.

Digital Vision Network

```
dvnetwork.net
roger@digitalfilmmaker.net
```

Online magazines focused on digital photojournalism and digital filmmaking. Member sites include: The Digital Journalist & The Digital Filmmaker.

DigitalZA Digital Imaging

```
www.geocities.com/digitza
eddie@nfi.co.za
```

This is a good general digital information site that is well organized. It has tons of information on hardware and software, news, tutorials; also features some very nice galleries.

DP–FWIW

```
www.cliffshade.com/dpfwiw
```

This acronym stands for Digital Photography–For What It's Worth. This site is a collection of informative articles about digital photography.

Emtech.net

15163 Burnt Pines Road
Northport, AL 35475

205-333-9185
Fax: 205-333-8288

```
www.emtech.net/cameralinks.htm
bjprice@emTech.net
```

This site is another digital camera links page.

EPI — Electronic Photo Imaging

www.epi-centre.com

This site has a vast library of useful information about almost every aspect of digital imaging, from basics to pretty advanced technical data. The site provides independent information about all aspects of digital imaging — including digital cameras, scanners, and printers. They also offer a wide array of courses and seminars.

Extreme Tech

www.extremetech.com
jason_young@ziffdavis.com

This is a high-end information service developed by media giant Ziff Davis and is focused on the bleeding edge of technology. This site includes an abundance of information on digital technology because Ziff Davis is at the forefront of all things technical these days. Choose from a variety of articles and forums.

FAQS.org

www.faqs.org/faqs/jpeg-faq

This site features extensive questions and answers about JPEG compression.

FLAAR Network

Technology Bldg. 126 B
Bowling Green State University of Ohio
Bowling Green, OH 43403

www.large-format-printers.org
www.fineartgicleeprinters.org/index.html
www.flatbed-scanner-review.org
www.cameras-scanners-flaar.org
www.wide-format-printers.org
Maya@yahoo.com

The FLAAR network is a privately funded organization dedicated to research into digital printing, scanning, and photography. It has two major research centers: one in Ohio and another in Guatemala. The research is extensive, actually comprising several Web sites crammed with information from its many tests of all sorts of equipment.

Focus on Photography

```
www.azuswebworks.com/photography/index.html
info@azuswebworks.com
```

This photographic reference site is free and fairly extensive.

FRCN Digital Imaging

```
www.quiknet.com/~frcn/Camera.html
frcn@cncnet.com
```

One of the most impressive lists of links for reference on all aspects of digital hardware and software, this site has a very straightforward approach that gives direct access to the information.

Hewlett-Packard Home and Office Site

```
www.homeandoffice.hp.com/hho/us/eng/digital_photography.html
```

A really comprehensive guide to taking better pictures, this site is a subset of the Hewlett-Packard site and has a subsection on digital photography that is very good. You will find many tutorials and troubleshooting guides that cover a wide range of topics relevant to digital imaging, such as printing, scanning, Internet and multimedia, memory storage, and computers.

Imaging Resource Center

```
www.imaging-resource.com
web@imaging-resource.com
```

The Imaging Resource Center is a very useful site if you are in the market for a camera and don't know which one you want or need. They have a selection of very useful tools and a very complete and current database. The site features comparison charts, a camera finder, and comparometer, which allows you to compare identical scenes shot with almost every digital camera on the market.

Infrared Digital Photography page

Chris Maher
PO Box 5
Lambertville, MI 48144

734-856-8882

```
infrareddreams.com
Chris@chrisMaher.com
```

This site features lots of useful information and resources for anyone interested in infrared digital photography. They also have a mailing list.

Marscuba.com

```
www.marscuba.com/uwdigital.html
matt@marscuba.com
```

This site features information that deals specifically with underwater housings for digital cameras.

Nerd World — Digital Photography section

Nerdworld, 8 New England Executive Park
Burlington, MA 01803

781-272-6599
Fax:781-852-5375

```
www.nerdworld.com/nw9411o1o0.html
nerds@nerdworld.com
```

This site has an extensive list of interesting links on digital photography.

Panoguide.com

```
www.panoguide.com
```

A good guide to panoramic photography and object movies, this site covers many areas of panoramic photography, including general information on how to make a panorama, choosing the right stitching software, and a nice gallery of motion panoramas. The site even goes over how to publish your work on the Internet. This information is for both beginners and advanced photographers.

PC — Photo Review

Consumer Review, Inc.
205 Town and Country Village
Sunnyvale, CA 94086

800-306-3375
408-738-7300
Fax: 408-737-2803

```
www.pcphotoreview.com
feedback@pcphotoreview.com
```

This site claims to be the most comprehensive resource for digital cameras on the Web. It features consumer product reviews of more than 150 digital cameras and a classified section where you can advertise outmoded equipment. The site also has an online printing service, a tips and tricks section, and announcements of breaking developments in digital photography.

Photo.net

80 Prospect St.
Cambridge MA 02139

617.386.4298
Fax: 617.354.8581

www.photo.net/learn/reviews-digital-camera
feedback@photo.net

This online member community for photographers provides support in the form of member reviews, forums, store, member galleries, an extensive learning center, and more. This community is among the larger of its sort.

PIE-Photo Electronic Imaging

www.peimag.com
tmurphy@ppa.com

This publication is dedicated exclusively to electronic imaging, photography, and computer graphics. This site presents articles on imaging technology, step-by-step downloadable tutorials, Internet publishing, hardware and software reviews, features, and images from today's digital artists.

PhotoLinks

www.photolinks.net

PhotoLinks is a free directory and portal service dedicated to providing easy access to as many photographic resources as possible. You can search links by category (one for nearly every facet of photography — digital or otherwise). You can place your own site on PhotoLinks at no charge, simply by promising to provide a link on your site back to PhotoLinks.

PhotoPoint Corp.

200 W. Evelyn Avenue, Suite 200
Mountain View, CA 94043

www.photopoint.com

PhotoPoint is the largest and most critically acclaimed photographic community on the Internet, offering free online photo albums, news, reviews, how-tos, discussion boards, e-commerce, Digital Camera Magazine online, and access to shopping via State Street Direct.

Poynter.org

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www.poynter.org
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This site is designed to guide you to useful information about photojournalism. Photojournalism is becoming almost completely digital because of the economics and time frames. This site has a whole section on links related to digital photography and journalism.

Profotos.com

1250 W. Dorothy Lane, Suite. #124

Kettering, OH 45409

937-396-0587
Fax: 937-396-0587

```
www.profotos.com/education/referencedesk/digital/index.shtml
info@profotos.com
```

This extensive photographic resources site was set up by a small group and is totally free. The site is well worth a visit and with membership, you get a newsletter, gallery space, and listings.

robgalbraith.com

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www.robgalbraith.com
questions@robgalbraith.com
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This site is dedicated to news and articles targeted for digital photojournalists in order to help them better understand how to master the field.

The Darkroom

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www.got.net/~pino
slinky@sirius.com
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This site is simple and straightforward in its approach and message. It shows photos before and after a number of special effects done in PhotoShop. The artist also includes an explanation of what was done to achieve the effect.

The Digital Artist

www.thedigitalartist.com
the_digital_artist@compuserve.com

This site is the motherload of digital artists of all types. In addition, this site has a newsletter, chat room, bookstore, bulletin board, and resource center.

The Digital Camera Guide

www.digitalcamera-guide.com
webmaster@guide4photography.com

This is an online store with a lot of useful information on understanding digital cameras and accessories and advice on how to buy them. This site even has a whole section on spy cameras!

sRGB

www.srgb.com
mary_nielsen@hp.com

This site is an in-depth look at the sRGB color space from Hewlett-Packard, and includes technical information and ICC profiles. The site also includes a very comprehensive list of links to professional organizations associated with color and lighting standards.

Top Digital Camera Reviews

www.top-digital-camera-reviews.com

This small site compiles weekly information on the current cameras on the market and chooses the top five in three categories: budget, midrange, and professional.

Wetpixel

www.wetpixel.com
info@wetpixel.com

A site dedicated to underwater digital photography and features news, forums, reviews, and galleries.

Organizations

Digital photography societies, most of which are sub-divisions of long-standing photographic societies, are good places to look for information, contacts, and even some pretty good parties.

Photographic Society of America
Electronic Imaging Division

psa-eid.org
admin@psa-eid.org

The Photographic Society of America is a nonprofit organization with more than 6,000 members. The organization is established as a medium for cooperative action in promoting the arts and sciences of photography and for furthering public education therein. PSA provides members with an opportunity to participate in a multitude of services and activities. The site also includes a member exhibition gallery of digital images.

Photo Marketing Association International

3000 Picture Place
Jackson, MI 49201

517-788-8100

www.pmai.org

This is the official organization of manufacturers, distributors, and retailers engaged in the marketing of photographic products. Its annual show in Las Vegas is the photography equivalent of Comdex to the computer industry. This Web site is a rich source of information on photography — especially on the digital level. The site includes breaking industry news, links to all the member associations (such as DIMA, the Digital Imaging Marketing Association), PMA Sections and Societies, Imaging Industry Links, and PMA publications (such as Digital Imager), to name only a few.

Professional Photographers of America, Inc.

229 Peachtree St. NE, Suite 2200
Atlanta, GA 30303

404-522-8600

www.ppa.com
csc@ppa.com

PPA is a non-profit membership organization aimed at professional photographers that provides a wide array of services to it members. It currently boosts over 14,000 members. The site has numerous features, including a calendar of events and competitions, an imaging professional locator, a store, and much more.

Publications

When it comes to digital photography publications, this section has a little bit of everything: book publishers, conventional magazines with online presences, and some pretty amazing e-zines.

Amherst Media, Inc.

155 Rano Street, Suite 300
Buffalo, NY 14207

800-622-3278

www.amherstmedia.com

A photographic book company with books on basic 35mm, black-and-white photography, techniques, portraiture, camera repair, and weddings. It only carries a couple of books specifically about digital photography, but because many of the principles of photography are the same, regardless of digital or film, this book source is important to you as a photographer.

Digital Output

13000 Sawgrass Village Center, Suite 18
Ponte Vedra Beach, FL 32082

904-285-6020

www.digitalout.com

Digital Output is a monthly digital industry publication distributed mostly to service bureaus, prepress and reprographic houses, designers, printers, and ad agencies. This online store specializes in digital photography solutions: digital cameras, CompactFlash, SmartMedia, card readers, printers, and NiMH batteries. One of the solutions offered by this store is the Unity Pro power pack, which triples the length of time your camera can go without changing batteries.

Digital Sauces

Post Office Box 142
East Schodack, NY, 12063-0142

518.331.3232

www.digitalsauces.com
dhays@haysdesign.com

Digital Sauces is an online publication that focuses on digital cameras and accessories.

digitalphotography.com

www.digitalphotography.tv
Charlie@digitalphotography.tv

This is a nice online magazine with good presentation, offering galleries with a feature called "Lessons Learned," where photographers can discuss things they learned in taking the photographs. The site is rounded out with shopping, a newsletter, and a resource section.

eDIGITALPHOTO.com

5211 S. Washington Ave.
Titusville, FL 32780

321-269-3212
Fax: 321-269-2025

www.edigitalphoto.com
editorial@edigitalphoto.com

This is a very professional and comprehensive online magazine dedicated to digital photography.

ePHOTOzine

+44 (0) 1909 488 305

www.ephotozine.com
mail@ephotozine.com

This is an online magazine for photography that also features digital photography. It is loaded with news and articles with photos, how-tos, and reviews. This is a slick professional production and well worth a look.

Megapixel

www.megapixel.net

This is a monthly digital still camera Web magazine, published in both French and English. Another source of reviews of digital cameras and excellent articles on various aspects of digital still camera technology.

PCPhoto Magazine

PO BOX 56381
Boulder, CO 80322-6381

www.pcphotomag.com
pcphotomag@neodata.com

This magazine site is focused on digital imaging so you get concentrated information on the subject of your choice. It is filled with great articles on digital imaging, new product reviews, and other current news; the magazine is very colorful and features lots of pictures.

Photo Imaging Entrepreneur

www.photoprofits.com

This magazine is aimed for the digital printer who wants to make a living from his or her photography and digital printing. PIE has a nice layout and is a good resource for finding the newest photo-digital gadgetry and accessories.

Popular Photography

1633 Broadway
New York, NY 10019

212-767-6000
Fax: 212-333-2434

www.popphoto.com/index.asp
popphoto@hfnm.com

This Web site for Popular Photography Magazine includes a wide range of articles on all aspects of photography.

Shutterbug Magazine

5211 S. Washington Ave.
Titusville, FL USA 32780

321-269-3212
Fax: 321-269-2025

www.shutterbug.net

Photography's if-you're-looking-for-it, this-is-the-place-to-start magazine. This magazine has ads from virtually all the large camera makers and sellers in the United States. The magazine's ad prices are used as a benchmark for buying, selling, and trading cameras and camera equipment worldwide.

Services

For the most part, you can hire these organizations to do work for you that require equipment, a higher budget, or more expertise than you can really afford for the occasional job.

ACTion Imaging Solutions

Kings Hall, St. Ives Business Park
St. Ives, Huntingdon,
Cambridgeshire, PE174WY U.K.

+44 (0) 1480 464618

www.action-imaging.com

This is the Web site of a British firm offering large-scale printing and scanning devices. Its products seem to be mostly used by engineering and large graphics firms and architects. It manufactures the ANAtech, Colortrac, and Tangent lines of printers and scanners.

Cone Editions Press

17 Powder Spring Road
East Topsham, VT 05076

(802) 439-5751

www.cone-editions.com
jon@cone-editions.com

One of the original studios to start producing digital prints. Cone Editions is a leader in giclée printing technology and is a leader in developing new techniques and products and providing expert consulting to many other service bureaus. Cone Editions Gallery is in New York City at 560 Broadway.

Digimarc

Digimarc Corporation
19801 SW 72nd Ave. Suite 100
Tualatin, OR 97062

800-DIGIMARC

www.digimarc.com

Digimarc is recognized as the leader in digital watermarking for the copyright protection with electronic media.

Digital Pond

88 Arkansas Street
San Francisco, CA 94107

415-216-8200
Fax: 415-216-0929

inquiries@digitalpond.com
www.dpond.com/indexf.ssi

This high quality service bureau was founded in the early 1990s. They specialize in producing museum-quality scans, film, and Iris prints for fine artists, designers, and photographers. Digital Pond has been one of the pioneer groups in developing better printing techniques for digital imaging.

EZ Prints

888-584-7040

www.ezprints.com

EZ Prints offers archival prints from your digital files: 4 x 6-inch prints for $0.49, 8 x 10-inch prints for $2.95, and 11 x 14-inch prints for $5.25.

Frame, Inc.

181 Westchester Avenue
Port Chester, NY 10573

914-937-0318

www.digi-frame.com

Totally digital Digi-Frame offers different sizes of small tabletop screens. You plug in
a SmartMedia or CompactFlash card from your digital camera into the back. Your
images appear instantly as a slide show.

Harvest Productions

8050 East Crystal Drive
Anaheim Hills, CA 92807

714-279-2300

Fax: 714-279-2301

www.harvestproductions.com
sales@harvestpro.com

This is one of the largest giclée print houses in the world. They are affiliated with
Digital Pulse, which allows them to benefit from the latest in technological advance-
ments. This is a state-of-the-art production. If you have a question about fine art
giclée printing, then these are the people to talk to.

Imagers Digital Production Center

Atlanta Technology Center
Building 400, Suite 490
1575 Northside Drive
N.W. Atlanta, GA 30318

800-398-5821
404-351-5800

www.imagers.com

A service bureau for all sorts of digital imaging, including making film slides from
your digital images. Other services include digital offset printing, Kodak Photo CD,
digital color posters, color laser printing, and digital photo prints, Web develop-
ment, and video services. The Imagers site is useful even if you don't use this
company's services because it contains considerable online advice about how to
prepare your files for the various processes. For some services, such as digital off-
set printing, a price-calculating form is available that takes into account such vari-
ables as the number of colors, paper size, and so forth. You can use this site to give
yourself a rough guide of the competitive pricing for printing your image files.

Nash Editions

2317 North Sepulveda Boulevard
Manhattan Beach
CA 90266 USA.

310-545-4352
Fax +1 310-796-1418

www.nasheditions.com
info@nasheditions.com

This is a high-end giclée print service bureau that uses primarily Iris printers. They focus on color and black and white photography and fine art. The company was founded by rock star Graham Nash who is also a very accomplished photographer.

Ofoto

A Kodak Company
5900 Hollis Street, Suite S
Emeryville, CA 94608

510-229-1200

www.ofoto.com/Welcome.jsp
service@ofoto.com

This site is an online photography studio that provides silver halide prints for digital and film camera users. You can use the free online tools on this site to do your own image-editing and creation of cropped borders and special effects. Customers can order prints, enlargements, photo cards, frames, albums, and other photo-related merchandise and have it delivered to their homes.

PhotoTrust

1500 114th Avenue SE, Suite 130
Bellevue, WA 98004

425-468-9041

www.phototrust.com

PhotoTrust hosts and manages a password-protected Web site that archives photographs created in any film-based or digital format. It uses XML technology to give users a way to collect, protect, retrieve, record, share, and enhance photos. One of the two largest manufacturers of digital film supplies and card readers. The company also manufacturers these products under the brand names of many major companies. You can find FAQs on all the products and download the latest drives from the company's Web site.

Skylark Imaging

365B Tesconi Circle
Santa Rosa, CA 95401

707-528-9192

www.skylarkimages.com
info@skylarkimages.com

Skylark is one of the premium digital print service bureaus on the west coast. They specialize in fine art giclées and digital photo printing. They also offer excellent color matching and correction and retouching services. Darren Briggs, the founder, is extremely knowledgeable about color calibration and will consult on setting up print systems.

Worldwide Direct-Digital Imaging Specialist

203 Route 22
Dunellen, NJ 08812

800-617-4686

www.buydig.com

Worldwide Direct will deliver to your home and business the latest technology of digital cameras, printers, scanners, memory, and accessories at the lowest legitimate price with excellent service.

Zing Network, Inc.

550 Fifteenth Street
San Francisco, CA 94103

www.z1ng.com

Zing is an online digital image community offering unlimited free storage, picture-upload and album-creation processes, and ZingCard photo-greeting cards. The company markets its site to the basic family consumer. From one-step digital camera-to-Web uploading to high-quality photo printing, Zing is building the infrastructure to advance and simplify digital photography.

✦   ✦   ✦

Hardware and Software Resources

The following list of resources is intended to provide you with a wealth of information relating to both the hardware and software necessary for digital photography. In most cases, I have tried to provide an address, a phone number, a web site, and a short explanation of what the services and/or products you can obtain through the given resource.

General Accessories

The companies listed in this section sell too wide a variety of supplies to tuck them neatly into one category. Mostly, I chose them for their respected names, huge inventories, better-than-average prices, and reputation for expertise.

AC Adorama

Adorama Camera, Inc.
42 West 18th Street
New York, NY 10011

800-815-0702
212-741-0466

www.adorama.com

info@adoramacamera.com

Adorama offers a beanbag camera platform and a fantastic Podmatic monopod ($90). This is a full-featured online photographic supply store with a nice lineup of accessories.

B&H Photo

420 Ninth Avenue
New York, NY 10001

800-606-6969

`www.02.bhphotovideo.com`

B&H Photo (no relation to Bell & Howell) offers an outstanding selection of professional format and digital photography supplies. This is also a brick-and-mortar superstore filled with hands-on demos. You can even download PDFs listing used equipment. The company's print catalogs can be ordered online and are virtual encyclopedias of photo and video accessories.

Beseler Photo

1600 Lower Road
Linden, NJ 07036

908-862-7999

`www.beseler-photo.com`

Known as a maker of photographic enlargers, Beseler also markets its own line of lighting equipment, chemistry, slide duplicators, copystands, camera and video carry bags, and various darkroom accessories.

Bogen Photo Corp.

565 East Crescent Avenue
Ramsey, NJ 07446-0506

201-818-9500

`www.bogenphoto.com`

Bogen Photo is an exclusive U.S. distributor of a large number of photo and digital photo products and accessories. This is an especially good resource for light stands, tripods, strobes, and other studio accessories. Product lines are Manfrotto, Gitzo, Metz, LPA, Gossen, Bogen, Avenger, Aurasoft, Reflecta, Elinchrom, as well as a large number of smaller manufacturers of such items as camera and darkroom accessories.

Casio, Inc.

570 Mt. Pleasant Avenue
Dover, NJ 07801

800-962-2746
201-361-5400

www.casio.com

This large Japanese company manufactures watches, digital cameras, digital color printers, and handheld computers. Casio is one of the most innovative gadget companies in the world. If you think something hasn't been built yet, check out Casio before you give up. Casio also makes many other products not related to digital photography. One of the most interesting new developments in digital photography is Casio's wrist camera. You can record name, address, and phone information along with a grayscale photo and then transmit the photos directly to your PC wirelessly via an infrared port.

Colex Imaging, Inc.

347 Evelyn Street
Paramus, NJ 07652

201-265-5670

www.colex.com

Colex is a distributor, manufacturer, and leasing agent of large photo-processing equipment and digital-processing equipment for image laboratories.

Daylab-Pfaff Products

400 E. Main Street
Ontario, CA 917619

800-235-3233

www.daylab.com

Daylab manufactures and sells contained Polaroid transfer and emulsion transfer process machines. No digital applications or transfers are available at this time, but the transfer process is an interesting alternative to normal film processing and printing.

d-store

650 West Ave.
Norwalk, CT

203-866-2362
888-313-1587

```
www.d-store.com
sales@d-store.com
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The d-store is an online store that specializes in accessories for digital cameras. It has a lot of information on rebate and clearances if you are looking for bargains. It even has specialty areas for dental and real estate digital imaging. If you're in the market for memory cards, this is one good place to look.

Ferrania USA, Inc.

Manufacturing and Administrative Services
2700 East Frontage Road
Weatherford, OK 73096

580-772-5515

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www.ferraniait.com/Worldwide/usa_dx.htm
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Ferrania has acquired the photo products division of Imation and manufactures 35mm color print and slide film, single-use cameras, and photo-quality inkjet paper for the consumer photographic market.

Filmguard Corporation

2110 Enterprise Street
Escondido, CA 92029

800-777-7744

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www.filmguard.com
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This commercial sleeving company offers many styles and varieties of professional roll and sheet sleeves for different film sizes and formats.

Gadgeteer.com

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www.the-gadgeteer.com
julie@the-gadgeteer.com
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This site is dedicated to all that can be classified as electronic gadgets, which includes digital cameras and accessories. The site is run by two self-confessed *gadgeteers,* or people who can't have enough of these devices to play with.

Gagne, Inc.

41 Commercial Drive
Johnson City, NY 13790

607-729-3366

www.gagneinc.com

Gagne manufactures and distributes lightboxes, frame boxes, projectors, light tables, and certain types of bellows.

Gamla Enterprises

16 West 36th Street
New York, NY 10018

800-442-6526

www.gamlaphoto.com

Gamla is a distributor of 35mm, APS, digital and disposable cameras, lenses, flashes, batteries, cases, binoculars, telescopes, and transceivers.

Gammacolor Image Technologies

3496 NW 7th Street
Miami, FL 33125

800-330-3312

www.gammacolor.com

Check out this exporter and retailer if you're looking for new or used photo-lab equipment and minilab supplies. Its products include photo processors, chemicals, and papers.

GEPE, Inc.

Geimuplast Partenkirchner Strasse
50 D-82490
Farchant
Germany

+49 (0) 8821-685-0

www.geimuplast.de

Geimuplast is an experienced manufacturer of plastic slide mounts and mounters.

Global Imaging, Inc.

248 Centennial Parkway, Suite 160
Louisville, CO 80027

303-673-9773

www.globalimaginginc.com

Global Imaging, Inc. is a seller and leaser of high-end hardware for digital color graphics. It offers cameras, printers, RIP scanners, and monitors for the professional digital imager.

Gretag Imaging Holding

AG 2070 Westover Road
Chicopee, MA 01022

413-593-6900

www.gretagimaging.com

Gretag is a Switzerland-based supplier to the global photo finishing and imaging technology markets. Its products and services range from minilabs, central labs, and Internet applications to hardware and software for professional photography and the advertising industry. Gretag owns Rastergraphic supplies — products for inkjet printers.

GTI Graphic Technology, Inc.

211 Dupont Avenue
Newburgh, NY 12550

888-562-7066

www.gtilite.com

GTI is an industry supplier of overhead luminaries, transparency viewers, and large-format viewing stations.

Hewlett-Packard, Inc.

3000 Hanover Street
Palo Alto, CA 94304-1185

650-857-1501

www.hp.com

This well-known U.S. company used to be known mainly for its handheld calculators but now has become a leader in the world computer market. H-P and Kodak have announced the formation of a joint venture for retail photo-finishing solutions, which offers retail customers a wide range of digital-imaging capabilities for both film and digital files. H-P also makes digital cameras and the best-established range of desktop printers.

Hoodman

P.O. Box 816
Hermosa Beach, CA 90254

800-818-3946

www.hoodmanusa.com

Hoodman makes glare-reduction hoods for just about any kind of a screen you might have to look at. You can get hoods to shade your computer or laptop monitor to aid in more accurate color calibration. The company also makes hoods for digital-still and video-camera LCD viewfinders in a variety of sizes, so it's a good bet that you can find a hood that will fit your camera. All the Hoodman hoods attach by means of Velcro strips, so you can easily and quickly remove them. The hoods fold flat when not in use. LCD hoods mostly retail for a mere $19.95 and can be bought directly from the company.

Kaidan, Inc.

703 East Pennsylvania Boulevard
Feasterville Business Campus
Feasterville, PA 19053

215-364-1778

www.kaidan.com

Kaidan makes products to help in making QuickTime VR stitched panoramas and object movies. For panoramas, the company makes numerous pan heads for tripods that center the optical axis of the camera over the control point and that are marked for specific degrees of rotation between shots. The resulting photos match very closely from edge to edge when rotated, which makes smooth stitching possible. The company also makes rigs for QTVR object movies. Object movies enable the viewer to rotate a product photo to any angle.

LaCie, Inc.

22985 NW Evergreen Parkway
Hillsboro, OR 97124

503-844-4500

www.lacie.com

LaCie is in the business of making FireWire and USB drives, calibrated monitors, CD-R/RW drives.

Logistic Locations

5-1 ITaunton Road
Greeford,
Middlesex UB6 8UQ
England
U.K.

+44 181-575-6601

www.logisticlocations.com
www.logistic-locations.com/Homex.html

The Dubois Sun Position Compass can tell you the height and position of the sun at any time of the day and year anywhere in the entire world. So if you need to plan a location shot in accordance with the best sun angle, this little jewel can save you a lot of time and money. The cost in U.S. dollars is $39. Americans also pay about $10 shipping and handling from the U.K.

Mitsubishi Digital Electronics America, Inc.

9351 Jeronimo Road
Irvine, CA 92618

888-307-0312
Fax: 949-465-6338

www.mitsubishi-imaging.com

Here, you can find digital printers, time lapses VCRs, photographic materials, and miscellaneous other digital-imaging equipment. Mitsubishi Imaging also markets photographic and digital printing paper and manufactures and sells analog and digital plate-making equipment.

Mitsubishi Electric & Electronics USA, Inc.

Americas Corporate Office, 5665 Plaza Drive
P.O. Box 6007
Cypress, CA 90630-5023

714-220-2500

`www.mitsubishi-display.com`

This is a huge Japanese conglomerate that also owns Nikon. Mitsubishi has three divisions that deal in digital display, imaging, and presentation products.

Photosolve

Phil Williams
21272 Chiquita Way
Saratoga, CA 95070

`www.photosolve.com`
`phil@photosolve.com`

Photosolve makes solution-providing attachments for digital cameras, such as the Xtend-a-View detachable hood for LCD screens, extenders for attaching supplementary lenses and accessories to such retractable lens cameras as the Kodak DC-series of zoom cameras, and flash extension brackets. The company's prices are very reasonable.

Silicon Film Technologies, Inc.

16265 Laguna Canyon Road
Irvine, CA 92618

949-417-2260

`www.siliconfilm.com`

Silicon Film technologies has developed a digital camera insert for a few 35mm film cameras, mostly certain Nikons and Canons. This insert turns your SLR into a digital camera. Although the capacity for images is small, a downloader is also available.

Sima Products Corporation

140 Pennsylvania Avenue, Building #5
Oakmont, PA 15139

800-345-7462

`www.simacorp.com`

Sima produces unique products to meet the demands of different electronic inter-
ests. As for photography, the company produces a film shield to protect film from
airport X-ray devices. Sima also makes a portable 5.7-inch digital screen to view
digital photographs. An additional hard drive enables storage of more than 10,000
pictures. Also in its line of products are a portable emergency power source and a
power inverter that may be of interest to digital photographers.

SterlingTEK

877-742-1700

`www.sterlingtek.com`

This shopping site has a wide variety of accessories for your digital camera,
including AC adapters, memory, USB readers, camera bags, and more.

The Denny Manufacturing Company, Inc.

P.O. Box 7200
Mobile, AL 36670

800-844-5616

`www.dennymfg.com`

An innovative photography backdrop sales and manufacturing company with a
sweet Web site. Denny also has an interesting retail Web site at `www.dennyelectra.`
`com` for digital photography equipment. Denny seems to sell mainly Fuji desktop
products.

Optical Accessories

The following companies make accessories that fit over or onto your camera's lens.

Hoya Corporation

7-5, Naka-Ochiai 2-chome Shinjuku-ku,
Tokyo 161-8525
Japan

800-421-1141

www.hoya.co.jp

Hoya is one of the most renowned optical lens and filter companies in the world, boasting a 40-percent share of the world production of optical glasses.

Kenko-Tokina Company

Represented in the United States by

THK Photo Products, Inc.
2360 Mira Mar Avenue
Long Beach, CA 90815

800-421-1141 (customer service)

www.Ckcpower.com

Kenko makes an 8 x 32 monocular that can adapt to the lenses of many digital cameras — in particular the Nikon Coolpix 800, 900, and 950 series. In the U.S., the monocular retails for about $140.

Sigma Corporation

Sigma Corporation of America 15 Fleetwood Court
Ronkonkoma, NY 11779

631-585-1144

www.sigmaphoto.com

This manufacturer of lenses for 35mm cameras now also has its own cameras, including a brand-new digital camera that is the world's first to use separate over-laying sensors for red, green, and blue — just like film. Each sensor records just over 3 megapixels, but Sigma calls this a 6 megapixel camera, since some of the information overlaps. Sigma was one of the first manufacturers to successfully introduce interchangeable lenses for famous brand cameras, such as Nikon and Canon.

The Tiffen Company, LLC

90 Oser Avenue
Hauppauge, NY 11788-3886, USA

631-273-2500

www.tiffen.com
techsupport@tiffen.com

Tiffen offers a wide (perhaps the widest) variety of precise filters and color gels.

THK Photo Products, Inc.

2360 Mira Mar Ave.
Long Beach, CA 90815

(800) 421-114
562-494-9575

www.thkphoto.com

THK offers high-quality optics from a leading manufactures, including a large line of Hoya all-glass filters. THK also represents Kenko, which makes an 8 x 32 monocular that can adapt to the lenses of many digital cameras — in particular the Nikon Coolpix 800, 900, 950, and 5000 series. In the U.S., the monocular retails for about $140, though a $99 street price is fairly commonplace. Don't even think about using it without a tripod (or at least, a monopod).

Vivitar

1280 Rancho Conejo Boulevard
Newbury Park, CA 91320 USA

805 498-7008
Fax: 805 498-5086

www.vivitar.com

Originally known for its flashes and lenses, Vivitar has developed a comprehensive line of point-and-shoot digital cameras. The company has also developed a line of video-monitoring and video-conferencing products for both business and residential use.

Lighting Accessories

The companies included in this section make all sorts of lighting equipment, from external portable strobe units to traditional incandescent bulb and reflector setups.

AlienBees, Inc.

530 E. Iris Drive
Melrose, TN 37204

877-714-338

www.alienbees.com

This company makes very affordable lighting that has lower-than-average watt-per-second ratings that make their equipment especially well suited for use with digital cameras. That is because digital cameras seldom have minimum apertures smaller than f11. The studio strobes made for traditional equipment are often so bright that you can't stop down your digital camera far enough to compensate without using a neutral-density filter. You can buy Digital Monolights from $200 for 160ws to $339.95 for 640ws. Slave units are built in.

Britek

12704 Marguardt Ave.
Santa Fe Spring, CA 90670

888-879-9628

www.briteklight.com
service@shopperavenue.com

Britek has a whole range of very inexpensive screw-in strobes that would be ideal for tents and backlights. It also has light stands for reasonable prices and a light kit with snoots and carrying case for $389.

LumiQuest

28540 Durango Drive
New Braunfels, TX 78132

830-438-4646

lumiqst@gvtc.com
www.lumiquest.com

LumiQuest has a wide range of lighting accessories.

Photoflex, Inc.

333 Encinal Street Santa
Cruz, CA 95060

800-486-2674

www.photoflex.com

Photoflex offers a full array of flash strobe accessories from lightboxes to reflectors. Photoflex also has a photography school that has classes in digital photography.

STO-FEN

P.O. Box 7609
Santa Cruz, CA 95061

(800) 538-0730 831-427-0235

www.stofen.com
Ernesto@stofen.com

STO-FEN sells an all-direction bounce diffuser for swivel head flashes.

Wein Products

www.saundersphoto.com/html/body_wein.htm

Wein produces the industry standard for off-camera flash slave triggers. Flash slave triggers are one way to synchronize studio strobes with prosumer and consumer digital cameras that lack a hot-shoe or PC connection for an external flash. Wein also makes another accessory that's invaluable for owners of digital cameras that have hot shoe attachments for digital flash called the Wein Safe-synch. It protects the digital camera's circuitry from shorting out when used with powerful studio strobes or proprietary flashguns. A Safe-synch is excellent insurance against costly repair bills.

Ink and Paper

The following companies make or sell inks and papers especially suited for printing digital photographs.

Epson America, Inc.

3840 Kilroy Airport Way
Long Beach, CA 90806

562-276-1300

www.epson.com

Here you will find announcements of the latest developments in Epson cameras, printers, and papers. Excellent articles (that change from time to time) also cover such subjects as how to choose the right colors for use in a graphic design or how to share information between MS PowerPoint and other Office programs. Epson also has an extensive line of inkjet specialty papers and continues to make its photo papers more and more fade-resistant.

Gatorform

P.O. Box 1839
Statesville, NC 28687-1839

800-438-1701

www.gatorfoam.com

A subsidiary of International Paper, Gatorfoam is a supplier of foam core products on which you can mount photographs and other artwork. It is offering JetMount, a graphic arts board designed to survive the rigors of digital imaging. The foam is reinforced to resist dents and provide good durability.

Inkjetmall.com, Ltd.

PO Box 335
Bradford, VT 05033

888-426-6323

www.inkjetmall.com
jon@cone-editions.com

Inkjetmall.com is a distributor of replacement inks for many name-brand inkjet printers. It markets a bulk ink system, which can be adapted to many printers. In addition, it handles specialty papers, color management products, and ICC profiling services. It also provides an abundance of expert technical information online and by request.

Legion Paper

Legion Paper West
6333 Chalet Drive
Los Angeles, CA 90040

800-727-3716
Fax: 562-927-6100

www.legionpaper.com
info@legionpaper.com,

Legion Paper is a premier source for fine art paper, digital fine art paper, handmade paper, and decorative paper. Legion is the exclusive distributor of Somerset and Concorde digital fine art papers, which are the most widely used by professional service bureaus.

PICTORICO

AGA Chemicals, Inc.
Pictorico Ink Jet Media Division
2201 Water Ridge Parkway, Suite 400
Charlotte, NC 28217

www.pictorico.com
orders@pictorico.com,

Pictorico produces a wide variety of films, papers, and canvases material for inkjet printing.

Power Sources

These companies make batteries, power supplies, battery packs and other equipment that can be used to power your cameras and lighting equipment.

Eveready Battery Co, Energizer Division

800 Chouteau Avenue
St. Louis, MO 63164

800-383-7323

www.energizer.com

Eveready Battery Company is the world's largest manufacturer of dry cell batteries and flashlights and a global leader in the dynamic business of providing portable power. The Web site is a very rich resource for information on battery technologies and offers wizard-type guides to help you find the right battery. There is also a guide to finding stores that sell batteries. Did you know that you would have to buy $2,500 worth of alkaline batteries to take the same number of pictures as one $22 set of NiMH batteries?

Maha Energy

545-C W. Lambert Rd.
Brea, CA 92821, USA

800-376-9992

www.powerexusa.com

Here you can find PowerEX brand batteries and chargers for consumers and professionals.

Sunn Battery Company (Powertron Batteries)

1316 West Adams St.
Jacksonville, FL 32204

904-354-4508
Fax: 904-358-7753

www.sunnbattery.com
sunnbattery@hotmail.com

This is a one-stop shop for all kinds of batteries for every kind of device you can imagine.

Digital Camera Manufacturers

New makers of digital cameras are popping up at every blink of the eye these days, so this list is not comprehensive; however, it does include the most established and best-known makers of digital cameras.

Agfa

200 Ballardvale Street
Wilmington, MA 01887

800-685-4271

www.agfahome.com

Agfa is a huge multinational company that specializes in imaging and prepress products. The company makes a line of digital cameras and is overdue for an announcement of a higher-resolution and more fully featured digital camera. The company also makes an extensive line of desktop flatbed scanners (ten distinct models at last count), including the DuoScan series that is also capable of scanning film without pressing it against glass, thus eliminating the risk of reflections and Newton rings. This series comes in a variety of sizes, capabilities, and prices to suit a range of buyers from the serious graphics hobbyist to the professional design shop. Speaking of scanners, the DuoScan HiD is one of the most advanced flatbed scanners available, with an optical resolution of 1,000 x 2,000, D-max of 3.7, and 42-bit color depth. The scanner also comes with color-matching software.

Finally, Agfa is a source for inkjet photo-quality papers. Navigate to this area of the site, and you will find a wizard that shows you the proper settings for any of these papers when used with almost any of the popular printers. When I checked these settings for my two Epson printers, I found that the recommended settings would have worked well for most papers of similar quality from other manufacturers. For that reason, you may find this site useful whether or not you are actually printing on Agfa papers.

Canon USA, Inc.

One Canon Plaza
New Hyde Park, NY 11042

800-672-2666
516-598-3350

www.usa.canon.com

Canon is an industry leader in professional and consumer imaging equipment and information systems. Canon's extensive product line enables businesses and consumers worldwide to capture, store, and distribute visual information. The Web site can be seen in Flash 4, and if you have a high-bandwidth connection, the experience is even better. Unfortunately, there's more show than go here. You can see animated spinning movies of the products, but it's tough to get to the specifications. Canon does feature some of the most advanced developments in digital cameras, such as the 3 megapixel PowerShot S20 camera. The S20 is compatible with both Type I and II CompactFlash memory cards, so it can read and write to the IBM 340MB Microdrive. Also, the ISO rating is selectable at 100, 200, or 400. The camera also has a USB port. Canon also manufactures three professional 35mm SLR digital cameras that make use

of the company's extensive line of EOS camera lenses and accessories, as well as co-manufacturing several of the Kodak professional 35mm SLR cameras. The new Canon D-60 is a 6 megapixel CMOS sensor camera that has been getting rave reviews for image quality. Canon is also a major manufacturer of scanners and has an extensive line of flatbed scanners. Especially noteworthy is the under-$700 CanoScan FS2710 Film Scanner, which features 36-bit input and output at 2,720 dpi (film resolution) and can scan as fast as 13 seconds per frame (even faster than the Nikon scanners).

Casio, Inc.

570 Mt. Pleasant Avenue
Dover, NJ 07801

800-962-2746
201-361-5400

www.casio.com

Casio is a large Japanese manufacturer of watches, digital cameras, digital color printers, and handheld computers. Casio is one of the most innovative gadget companies in the world. If you think they haven't built it yet, check out Casio before you give up. Casio also makes many other products not related to digital photography. One of the most interesting new developments in digital photography is Casio's wrist camera. You can record name, address, and phone information along with the grayscale photo and transmit the photos directly to your PC wirelessly via an infrared port.

Eastman Kodak Company

343 State Street
Rochester, NY 14650

800-235-6325

www.kodak.com

Kodak manufactures both traditional and digital cameras, photographic plates and chemicals, processing and audiovisual equipment, as well as document management products, applications software, printers, and other business equipment. This was one of the first major companies to put its faith into digital photography, and it still often leads the pack in new developments, innovation, and quality. The Kodak Web site is also full of helpful information and tips for photographers at all levels of expertise. The site also plays host to magnificent displays of professional photography, complete with stories of how the photography was done. This is also the place to learn about Kodak's Photo CD, Picture CD, and Picture Disk services, the company's full line of digital cameras and accessories, online photo print-making services, printers and printing supplies, and breaking news on new developments in conventional and digital photography. Kodak is also one of the leading manufacturers of digital image sensors for sale to other camera makers.

Epson America, Inc.

3840 Kilroy Airport Way
Long Beach, CA 90806

562-276-1300

www.epson.com

Here you will find announcements of the latest developments in Epson cameras, printers, and papers. Excellent articles (that change from time to time) also cover such subjects as how to choose the right colors for use in a graphic design or how to share information between MS PowerPoint and other Office programs. Epson also has an extensive line of inkjet specialty papers and continues to make its photo papers more and more fade-resistant.

Fuji Film

Fuji Photo Film U.S.A., Inc.
555 Taxter Road
Elmsford, NY 10523

800-755-3854

www.fujifilm.com

Fuji is a large Japanese corporation that produces products for standard and digital photographic imaging across the board. They have a wide selection of digital cameras, scanners, and other peripherals for the consumer and professional. Some of their best model digital cameras are in the FinePix series, including FinePix S1 and S2 Pro, FinePix 6900, and FinePix 30i (which also plays MP3s).

Konica

500 Day Hill Road
Windsor, CT 06095

800-456-6422

www.konica.com

Konica is a digital and a photographic industry leader in providing digital solutions for document creation, production, and distribution as well as cameras, scanners, and more. At this time, Konica seem to be highly involved in the race for a faster megapixel digital camera.

Kyocera Corp., Yashica Division

8611 Balboa Avenue
San Diego, CA 92123-1580

800-526-0266
858-576-2600

www.yashica.com

This is the site for the Yashica camera division of Kyocera. Yashica's Samurai digital cameras include a 2.1 megapixel model with a 4:1 zoom lens. Too bad there's no provision for external flash synch. Yashica also makes bargain-priced 35mm SLR film cameras either fully automatic or fully manual. Kyocera also manufactures Contax cameras and Carl Zeiss lenses.

Largan Lmini

2432 W. Peoria Avenue Building 9
Suites 1165 and 1166
Phoenix, AZ 85029

877-4LARGAN
877-452-7426

www.largan.com

Largan is a Taiwanese manufacturer of entry-level digital cameras. The first two offerings in the line are VGA-resolution, fixed-lens cameras at $180. There are announcements on the site of higher-resolution models to come (up to 1.5 megapixel), but no time frame or pricing is given.

Mamiya America Corporation

www.mamiya.com

This Japanese camera manufacturer specializes in medium-format cameras. Mamiya's cameras are among the most popular for adapting to professional digital camera backs.

Minolta Corporation

101 Williams Drive
Ramsey, NJ 07446

201-825-4000
201-818-3512

www.minoltausa.com

Minolta makes an extremely affordable line of high-quality film scanners, as well as consumer digital cameras with removable lens units that can be placed for photographing subjects at unusual angles or swapped with special-purpose lens units. Minolta is also a large manufacturer of film-based 35mm SLR and point-and-shoot cameras and lenses as well as a manufacturer of office and prepress equipment. The company's Dimage and QuickScan 35 film scanners are some of the best buys around. Unfortunately, you will have a very tough time getting replacements if you lose or misplace any of the parts, such as a film holder.

Nikon Corporation

1300 Walt Whitman Road
Melville, NY 11747-3064

800-526-4566
631-547-4200

www.nikonusa.com

This site features cutting-edge products from a company that is famous for its traditional film cameras and (particularly) lenses. Nikon is one of those most heavily focused on digital photography. The Nikon Dl digital camera made a significant price-performance breakthrough, and the Coolpix 950 was the top-selling prosumer digital camera in 1999 and one of my personal favorites. This is also a company to look to for digital film scanners, which have recently undergone a price reduction. The Nikon Coolscan III is a thoroughly professional 35mm/APS film scanner for less than $800. Also, Nikon's Digital Ice technology is available on this scanner and can be a lifesaver in production scanning for removing surface dirt and scratches.

Olympus Optical Co., Ltd.

Two Corporate Center Drive
Melville, NY 11747-3157

800-347-4027
631-844-5000

www.olympus.com
www.olympusamerica.com

Olympus has consistently been among the most popular suppliers of digital cameras and has a particularly outstanding selection of prosumer digital cameras. Olympus also sells a healthy range of cases, straps, auxiliary lenses, and other accessories for its digital cameras.

Panasonic

2 Research Way
Floor 3
Princeton, NJ 07094

800-211-PANA (7262)
609-734-0800

www.panasonic.com

Panasonic's latest digital camera development is a 1.3 megapixel digital camera with a 3x optical zoom that stores its images on an Imation SuperDisk and has a USB connection to the computer. Because SuperDisks hold 120MB, you can store up to 1,500 images on a single disk. This is promising technology for those who would like to take digital cameras on long trips away from home. The camera can be used as an external SuperDisk drive and can also use and store images on ordinary 3.5-inch HD floppy disks. The built-in SuperDisk drive does mean that the camera has to be as large as a Sony Mavica, but you do get a 2.5-inch LCD for previewing images. This camera will also record QuickTime movies up to 100 frames and will do burst recording of up to 16 images at half-second intervals. Panasonic also makes a 1.3 megapixel 3x zoom camera that has dual CF card slots and that comes with a modem in the CF card form factor. You can put the CF card into one of the slots and directly e-mail images from the camera without having to rely on a computer.

Pentax Corporation

35 Inverness Drive East
P. 0. Box 6509
Englewood, CO 80155-6509

800-877-0155

www.pentax.com

Pentax has been a leader and prominent contributor to the world's 35mm SLR, its lenses, and in the 35mm compact zoom market.

Sanyo USA

2055 Sanyo Avenue
San Diego, CA 92154

619-661-1134
619-661-6066

www.sanyodigital.com

Sanyo, in conjunction with Olympus and Maxell, has developed a new digital film storage medium — a 50mm re-recordable optical disk called the iD Photo. The disk has a 730MB capacity. iD Photo's capacity makes it possible to store large amounts of image data on the camera for moving pictures, high-resolution still images, and still images with voices added. Sanyo says it expects that other exciting applications, such as digital album disks with electronic photo album functions, will also be possible. Sanyo expects the digital still camera market to reach more than ten million units by 2002. Another extremely interesting product from Sanyo is a CD-R CD writer with built-in slots for SmartMedia and CompactFlash I and II cards (including the IBM Microdrive) so that you can record the contents of the cards directly to the CD-R without ever having to store them on your hard drive. The drive can also be used in conjunction with a computer for normal CD-R recording tasks as well. There are also video outputs (including S-VHS) so that the recorder can be connected to any TV set for previewing images, movies, and sound without having to connect the unit to a computer.

Sea & Sea Underwater Photography USA

1938 Kellogg Avenue
Carlsbad, CA 92008

760-929-1909

www.seaandsea.com

This is an industry leader in the manufacture of underwater cameras and underwater housing to contain both still and video photography. I saw nothing specific on its Web site about housing for digital cameras, but perhaps it's only a matter of time.

Sony Electronics, Inc.

3300 Zanker Road
San Jose, CA 95134

800-222-SONY
408-432-1600

www.sony.com

Sony's line of Digital Mavica cameras means no hassles with cables, interfaces, or drivers. The Digital Mavica uses standard 3.5-inch floppy disks and has an e-mail mode, and some models can even record video clips. The limitations are the amount of storage space available on a floppy disk and the slow speed at which a floppy disk writes. The amount of storage space limits these cameras to XGA resolution or less.

Sony's other line of digital cameras, the CyberShot series, uses the company's new Memory Stick as its digital film format. Sony's latest 2 megapixel digital camera, the CyberShot DSC F-505, was a breakthrough in zoom capability because it features a Carl Zeiss (super reputation for very high quality) 5x zoom lens (nearly twice the zoom range of other digital cameras). The other truly notable features are the camera's small size and swiveling lens (so you can shoot with the camera overhead or between your legs). Its weaknesses are lack of standard external flash sync and use of the Sony Memory Stick for on-camera storage.

Sony also makes the DSC-D700 and DSC-D770. They are nearly identical true SLR digicams with 1.5 megapixel resolutions and 5x optical zooms. These cameras have a hot-shoe connection for external flash. One particularly notable feature of the D700 series is its ability to display a histogram of the brightness values in an image and then give the photographer the ability to adjust exposure to accommodate the displayed distribution of brightness values. Imagine being able to use the Photoshop Levels command before you take the picture. The Nikon Dl has adopted this feature, and I'd love to see it appear on more affordable cameras. The DSC-D700 series cameras cost more than the 505, probably due to their SLR design. They'd seem to be ideal candidates for upgrading to 3 megapixel, but I haven't seen such an announcement yet.

Vivitar

1280 Rancho Conejo Boulevard
Newbury Park, CA 91320 USA

805-498-7008
Fax: 805-498-5086

www.vivitar.com

Originally known for its flashes and lenses, Vivitar has developed a comprehensive line of point-and-shoot digital cameras. The company has also developed a line of video monitoring and video conferencing products for both business and residential use.

Computers

The following companies are some of the best known for making portable and desktop computers.

Apple Computer, Inc.

1 Infinite Loop
Cupertino, CA 95014

408-996-1010

www.apple.com

People who are the most serious about digital photography tend to use Apple computers. The company's Web site carries a wealth of constantly changing information about graphics hardware and applications, tips and tricks, and late-breaking developments.

Conexant Corporation

4311 Jamboree Road
P.O. Box C
Newport Beach, CA 92658-8902

800-854-8099

www.conexant.com

Conexant, a worldwide semiconductor engineering and manufacturing firm, was an early developer of the image sensors that use CMOS process technology in digital cameras, instead of the earlier charge-coupled device (CCD).

Digital Now, Inc.

8401 Old Courthouse Road,
Suite 130
Vienna, VA 22182-3820

800-329-9678

www.digitalnow.com

Digital Now is a supplier of packaged computer hardware and software systems. It supplies systems for photo retailers that take images from roll film to digital, print, or online formats. Digital Now also has the Digital Photo Factory Web site for viewing and downloading uploaded images.

Handspring, Inc.

189 Bernardo Avenue
Mountain View, CA

650-230-5000
888-565-9393

www.handspring.com

Handspring produces a number of handheld computing devices with powerful imaging-handling capabilities. The most notable is the Visor model. With the addition of the Blaaer software, you can display photos and Web pages. There are also modules that you can add in order to convert it into a camera, phone, or mp3 player. The wave of the future, I think.

Hewlett-Packard, Inc.

3000 Hanover Street
Palo Alto, CA 94304-1185

650-857-1501

www.hp.com

This well-known U.S. company used to be known mainly for its handheld calculators, but now it has become a leader in the world computer market. H-P and Kodak have announced the formation of a joint venture for retail photo-finishing solutions that offers retail customers a wide range of digital-imaging capabilities for both film and digital files. H-P also makes digital cameras and the best established range of desktop printers.

Intergraph

Corporate Headquarters
Hunstville, AL 35894-0001

800-763-0242
256-730-2000

www.intergraph.com

This Windows-compatible computer maker specializes in high-performance workstations for visual production and publishing prepress applications. These systems are tweaked to the max for speed and capacity, and many have dual processors. Some of the computers are capable of using up to 8MB of RAM. If you are curious to see how much performance can be crammed into a Windows machine, this is the site to visit.

Zoran Corporation

3112 Scott Boulevard
Santa Clara, CA 95054

408-919-4111

www.zoran.com

Zoran markets integrated circuits, embedded software, and 1C intellectual property cores for digital video and audio applications. Zoran's products include JPEG codecs, digital audio processors, and MPEG and DVD decoders.

Digital Backs

The following companies make digital photo-recording instruments that fit the backs of medium and large format cameras in place of their standard film backs. These backs are typically quite costly and have resolution that is better than film.

Better Light, Inc.

1200 Industrial Road, Studio #17
San Carlos, CA 94070-4129

650-631-3680

www.betterlight.com

Better Light offers a line of digital backs for 4 x 5 cameras. The digital scanner type backs software, and the full setup starts at under $9,000. The company also offers a digital back for the RB/RZ 67. You can find Better Light products for sale and rent at Calumet Photography locations and online at www.calumetdigital.com.

MegaVision, Inc.

P.O. Box 60158
Santa Barbara, CA 93160

888-324-2580

www.mega-vision.com

MegaVision offers an award-winning list of high-quality digital camera backs for medium- and large-format cameras. The company also offers a battery-operated mobile hard disk pack for downloading images to and from a digital camera back. You can wear this pack on your belt for location shooting.

Phase One US, Inc.

24 Woodbine Avenue
Northport, NY 11768

888-PHASEONE
888-742-7366

www.phaseone.com

Phase One offers digital backs for medium- and large-format cameras. The digital backs enable you to get quality, one-shot, digital, high-resolution images.

Storage and Memory Systems

These products make it possible to store large quantities of archived images. Some are portable and can be battery-powered.

Addonics Technologies

48434 Milmont Drive
Fremont, CA 94538

510-438-6530
Fax: 510-438-5236 or 443-628-0314

Atc@addonics.com
www.addonics.com

This technology company specializes in innovative and compact external storage devices for all types of electronic devices, including the Pocket Digidrive digital card reader, which reads all six memory card formats.

Antec

47900 Fremont Boulevard
Fremont, CA 94538

510-770-7200
510-770-1200

www.antec-inc.com

Antec makes digital film card readers and an adapter so that PCMCIA cards can be used on a desktop computer, making it possible to exchange PCMCIA card devices and memory between laptops and desktops. One model ($99) of the digital film card readers will read from CompactFlash, SmartMedia, and PCMCIA cards — all in the same unit.

APS Tech

6131 Deramus
Kansas City, MO 64120

816-483-1600

www.apstech.com

APS is a manufacturer of competitively priced hard drives, removable storage, and other computer peripherals. The company also distributes and has an online store for many third-party products related to digital photography.

CompactFlash Association

P.O. Box 51537
Palo Alto, CA 94303

650-843-1220

`www.compactflash.org`

This is the industry association for CompactFlash. Here's where to find anything
you want to know about the inner secrets of CompactFlash flash memory technol-
ogy. You will also find a listing of the 99 digital cameras, 64 handheld computers,
Palm devices, and 43 other electronic platforms that supported the CF+ specifica-
tion at the start of the millennium.

Delkin Devices, Inc.

7950 Dunbrook Road
San Diego, CA 92126

858-586-0123

`www.delkin.com`

Delkin makes a 244MB CF card and many other digital camera memory devices. It is
also the manufacturer of the FlashPath SmartMedia floppy disk adapter. The com-
pany claims to manufacturer the highest-capacity flash memory cards in all types.
Delkin also manufactures an external battery pack for digital cameras that connects
through the AC adapter and offers as much power as 40,000 standard AA batteries.
SmartMedia, CompactFlash, FlashPath, and adapters are available.

Imation Enterprises Corp.

1 Imation Place
Oakdale, MN 55128-3414

888-466-3456

`www.imation.com`

This offshoot of 3M Corporation specializes in data storage, digital imaging, and
color correction. Imation is the maker of the SuperDisk, a 120MB removable storage
solution that is backwards-compatible with the ubiquitous HD floppy disk. At least
one manufacturer has already announced a digital camera that uses a SuperDisk as
its storage medium: The Panasonic PV-3D4090 digital camera features SuperDisk
technology, which enables users to save images directly onto a 120MB SuperDisk
disk or a 1.44MB floppy disk. SuperDisks have become popular with owners of
iMacs because their mechanism allows them to serve as either a floppy drive or
higher capacity removable storage device. Imation is also a source for CD-R and
CD-RW discs.

Kingston Technology Company

17600 Newhope Street
Fountain Valley, CA 92708

800-337-8470
877-KINGSTON (546-4786)
714-435-2600

www.kingston.com

Kingston is a major resource for all kinds of memory upgrades, including flash memory for digital film cards in a variety of formats.

Lexar Media, Inc.

47421 Bayside Parkway
Fremont, CA 94538

510-413-1200

www.lexarmedia.com
info@lexarmedia.com

Lexar is a developer and distributor of digital film.

Maxtor Corporation

500 McCarthy Boulevard
Milpitas, CA 95035

408-894-5000
Fax: 408-952-3600

www.maxtor.com

Maxtor is a manufacturer of hard disk storage devices. They have recently released the Personal Storage 3000xt, an external 160GB Firewire drive for less than $400. This provides mass storage with mobility and the flexibility of easy interface.

Microtech International, Inc.

Corporate Headquarters
242 Branford Road North
Branford, CT 06471-1303

800-626-4276
203-483-9402

www.microtechint.com

Microtech manufactures digital photography, middleware products, and memory solutions. These include CompactFlash, SmartMedia, and Type I/II/III PC Card media and PC Card readers for all systems. The company makes the only digital film card reader that will read both CompactFlash and SmartMedia cards at the same time — seeing each as a separate drive. The CompactFlash slot is Type II-compatible and can read the new IBM 340MB Microdrive (which you can also order from Microtech).

Minds@Work, LLC

15550 Rockfield Blvd. Suite C
Irvine, CA 92618

949-707-0600

www.mindsatwork.net
info@mindsatwork.net

The Digital Wallet is a small pocket device designed to store photos and other data. The Digital Wallet capacities range from 5 to 20GB, depending on the model. Such a device is a great addition to your digital camera because it enables you to offload enough photos to record a long trip.

PhotoTrust

1500 114th Avenue SE, Suite 130
Bellevue, WA 98004

425-468-9041

www.phototrust.com

PhotoTrust hosts and manages a password-protected Web site that archives photographs created in any film-based or digital format. It uses XML technology to give users a way to collect, protect, retrieve, record, share, and enhance photos. PhotoTrust is also one of the two largest manufacturers of digital film supplies and card readers. The company manufacturers these products under the brand names of many major companies. You can find FAQs on all the products and download the latest drives from the company's Web site.

SCM Microsystems, Inc.

47211 Bayside Parkway
Fremont, CA 94538

510-360-2300

www.scmmicro.com

SCM Microsystems has introduced a card reader called Dazzle 6 in 1 card reader. It reads all six digital film formats. SCM specializes in a wide range of products to support all aspects of digital image storage, editing, and transmission.

Display

The following are resources for displaying your digital photographs at meetings and events, as well as for editing your photos.

MON Mitsubishi Electronics Presentation Products

9351 Jeronimo Road
Irvine, CA 92618

888-307-0312

www.mitsubishi-presentations.com

This company offers LCD projectors and Megawall advanced display monitors.

NEC Computers, Inc.

15 Business Park Way
Sacramento, CA 95828

888-863-2669

www.nec-computers.com

Under both the NEC and Packard-Bell nameplates, this company makes an extensive line of Windows-compatible PCs that includes laptops, handheld computers, and monitors. Some of the handheld computers can use CompactFlash memory, so you can use these cards for multiple purposes.

NEC-Mitsubishi Electronics Display of America, Inc.

1250 North Arlington Heights Road, Suite 500
Itasca, IL 60143-1248

www.necmitsubishi.com

This company makes flat-screen and single-gun monitors (similar in principle to the Sony Trinitron) in a variety of sizes.

Printers

These companies make all sorts of devices for printing digital photos.

Akica Phototech

Corp. 2F, 16, Sec 2, Chung Yang S. Road
Peitou, Taipei
Taiwan

+886-2-28915155

www.akica.com

Akica offers an interesting thermal dye diffusion printer direct from a CompactFlash card or SmartMedia card. It has 300 x 300 dpi and uses 4 x 6-inch paper or label pages. You can print out an index of the images stored on your card and then choose one to print.

Digital Pulse, Inc.

8050 East Crystal Drive
Anaheim Hills, CA 92807

714-279-2370
Fax: 714-279-2371

www.digitalpulseinc.com
info@digitalpulseinc.com

Digital Pulse has been a pioneer in the testing and development of advance color printing technology aimed at the fine art market. Digital Pulse works with some of the largest inkjet printer manufacturers to fine tune new technology. In addition, it offers products to support professional giclée service bureaus.

Durst Dice America

16 Sterling Lake Road
Tuxedo, NY 10987

914-351-2677

www.Diceamerica.com

DDA manufactures equipment for recording images on many types of media. Both individuals and large companies use its products. DDA products include Cheetah RIP/Servers, Durst Lambda and Epsilon imagers, LVT film recorders, and Vista lenticular materials.

Epson America, Inc.

3840 Kilroy Airport Way
Long Beach, CA 90806

562-276-1300

www.epson.com

Epson pioneered the development of long-lasting methods and materials for printing digital photographs. Today, if you want your prints to last, your best bet is Epson. However, don't expect this to be the case forever. Other companies are already beginning to test the archival printing waters.

Epson Professional Graphics Division

800-463-7766

www.prographics.epson.com

This is the Epson division that specializes in wide-format printers and is the resource for checking up on the latest about proofing printers and printers for display and fine-art printing. You'll find an informative article on the workflow for digital proofing using an inkjet printer. There's also an article on how Nash Editions (one of the most highly regarded service bureaus for fine-arts printing) uses the Epson 5000 proof printer.

Hewlett-Packard, Inc.

3000 Hanover Street
Palo Alto, CA 94304-1185

650-857-1501

www.hp.com

This well-known U.S. company used to be known mainly for its handheld calculators, but now it has become a leader in the world computer market. H-P and Kodak have announced the formation of a joint venture for retail photo-finishing solutions that offers retail customers a wide range of digital-imaging capabilities for both film and digital files. H-P also makes digital cameras and the best-established range of desktop printers.

Jackson Digital Imaging Corporation

3595 S. Highland Drive, Suite 3
Las Vegas, NV 89103

800-584-8181

www.jacksondigital.com

This company offers digital printing system packages, which include the hardware, software, and training for printing on cups, T-shirts, and so on. The company sells its products online.

Scitex

3 Azrieli Center
Triangle Building 45th Floor
Tel Aviv 67023
Israel

+972 3 607 5755

www.scitex.com

Scitex specializes in manufacturing digital imaging solutions for graphics communication. It designs, develops, manufactures, markets, and supports products, systems, and devices for the digital preprint and digital printing markets. The product it is best known for in the digital imaging community is the Iris Printer series of large-format proofing printers. These printers are being used with high-longevity printing papers and archival inks to create collectible fine-art prints from digital files. The company's Graphic Arts Group includes Leaf digital cameras, smart scanners, data management solutions (including Ripro servers/archivers), Brisque digital front ends, Dolev imagesetters and platesetters, and Iris proofers.

The breakthrough news from Scitex is the development of the Leaf C-MOST 6.6 Megapixel CMOS image sensor. According to Scitex, this is the first full-size, 35mm CMOS sensor to be commercially developed. It is said to be thin enough to replace film in a standard 35mm camera. The result is that full-size, high-resolution images can be captured using standard 35mm lenses. Moreover, Scitex says that the sensors can be made price-competitive with standard CCD image sensors. No concrete announcement has yet been made as to when this sensor will appear in specific cameras or camera backs.

Seiko Instruments USA, Inc.

Seiko Instruments Austin, Inc.
1309 Rutherford, Suite 120
Austin, TX 78753

800-888-0817
512-349-6000
Fax: 512-349-6001

www.seiko.com

The Digital Imaging division of Seiko currently is recognized for its dye-sublimation and thermal-wax printing and color-management technologies. The color printers are for medical, scientific, graphics, and prepress purposes. Seiko is also the parent company of Epson.

Scanners

This section includes resources for scanners of all types (flatbed, film, drum) and in all price ranges.

Aztek, Inc.

23 Spectrum Pointe #209
Lake Forest, CA 92630

800-GRAPH-55
800-472-7455
Fax: 949-770-4986

www.aztek.com

Aztek is an industry supplier and consultant of digital software and hardware systems. Aztek claims to have sold more than 300 digital major production facilities/systems to a variety of Fortune 500 companies.

Heidelberg

1000 Gutenberg Drive
Kennesaw, GA 30144

888-546-6265
800-437-7388

www.heidelbergusa.com

Heidelberg is one of the largest and most influential companies in the digital printing industry. It makes both flatbed and drum scanners for serious users. These are the only drum scanners (according to Heidelberg) that natively work in CIE Lab color, which is also the native Photoshop color mode. Flatbed scanners are made by the company's Linocolor division at www.linocolor.com.

Microtek USA

16941 Keegan Ave.
Carson, CA 90746

310-687-5800

www.microtekusa.com

This company is most noted for manufacturing low, midrange, and high-end scanners with a price range from under $200 to over $4,000. It was one of the first companies to come out with a really affordable scanner.

ZBE Incorporated

7220 Hollister Avenue
Santa Barbara, CA 93117

805-685-2348

www.zbe.com

ZBE has developed a line of photographic laboratory enlargers and equipment controls. ZBE recently released its Satellite 3-D Digital Scanning System. The Satellite is the first auto-focusing scanning system that can scan all types of images, from small films to large three-dimensional objects. ZBE also has introduced a 50-inch wide high-quality digital printer.

General Retail Outlets

The following are both brick and mortar and exclusively online retailers of all sorts of photographic equipment.

Abe's of Maine

710-640-0402

www.abesofmaine.com

This is a camera store that does considerable mail-order advertising in photography and digital photography magazines and also has an online presence. Its catalog features only the most popular cameras and accessories. This is not the place to look for esoteric stuff. Shopper's reviews have been mixed, but most comment on excellent prices.

Adorama

42 West 18th Street
New York, NY 10011

800-803-0720

www.adoramacamera.com

A brick-and-mortar, full-spectrum camera store that advertises heavily in magazines and that has a comprehensive online presence. You can find most everything here, including point-and-shoot cameras, camera bags, view cameras, and studio equipment and accessories for professional photographers. Online reviews of this store and its policies are heavily mixed.

Best Stop Digital

12 Warren Street
New York, NY 10007

800-339-8357

www.beststopdigital.com

Although this online store also carries 35mm film cameras, it also carries one of the widest ranges of digital cameras. As a result, it's a good place to look for current pricing. According to Best Stop, "Our prices are so low, you'll want to take a picture of them." (Or maybe a screenshot?) This store is also a comprehensive resource for digital video and photo printers.

Calumet Digital Solutions

890 Supreme Drive
Bensenville, IL 60106

888-237-2022

www.calumetdigital.com

CDS sells and leases a wide range of digital cameras, computer systems, lighting equipment, output devices, printers, proofers, and scanners, plus hundreds of other digital products. Some of its lines include MegaVision, Better Light, Kodak, Fuji, Nikon, Agfa, and Apple. It has locations in many major cities and is a real source for digital equipment with a very helpful and knowledgeable staff.

Camera World of Oregon

700 NE 55th Avenue
Portland, OR 97213

800-226-3721

www.cameraworld.com

This is yet another online and brick-and-mortar camera store that sells a fairly good selection of digital cameras and camcorders. Camera World also sells a variety of digital film cards, scanners, and printers.

Ckcpower.com

Graywood Drive
Orangeburg, NY 10962

845-627-1055

www.Ckcpower.com
sales@ckcpower.com

This is a full-featured shopping site for digital cameras and accessories.

Darkroom

1944 Atlantic Boulevard, Suite 300
Jacksonville, FL 32207

904-398-9934

www.desktopdarkroom.com

Desktop Darkroom offers all you need in a digital store, from complete, digital systems to the training and support needed to operate them. The company offers products such as cameras and printers for amateurs or professionals.

Digital Camera Depot

www.digitalcameradepot.com
orders@amazon.com

This is a good, general-purpose hardware site. It has reviews, comparisons, and discussion forums. Also, because it's associated with Amazon.com, it also has a decent book section. Orders are handled through Amazon, so you have a lot of reliability here.

Digital Etc.

800-774-7282
Fax: 800-943-5000

www.digitaletc.comDefault.asp

sales@digitaletc.com

This online store is dedicated to digital gadgets of every size, shape, and variety, from digital cameras to GPS watches. There are lots of home appliances, film and film cameras, batteries and battery chargers as well.

Filmart

4111 Glenwood Road
Brooklyn, NY 11210

718-421-6517

www.filmart.com

This online photographic store claims to have a large temperature-perfect warehouse. This is another in a long line of New York retailers offering a full range of camera equipment cheaper than your hometown store can.

Focus Camera

888-221-0828
718-436-6262

www.focuscamera.com

This company offers a large selection of digital cameras and some of the lowest prices I've seen. The same online store also sells equipment and accessories for conventional photography and a large selection of hobbyist underwater gear. Focus also has a good assortment of accessory lenses and filters in sizes that will fit many of the most popular digital cameras.

Gross-Medick-Barrows (G-M-B)

1345 Export Place
El Paso, TX 79912

800-777-1565

www.g-m-b.com

Gross-Medick-Barrows is a long-time supplier for the professional photographer. Some of its product line includes folders, easels, folios, proof books, and wedding albums. G-M-B seems to go to some length to accommodate the changes in photographers' needs.

Norman Camera and Video

3602 S. Westnedge Avenue
Kalamazoo, MI 49008

800-900-6676

www.normancamera.com

This online photography store carries an extensive array of both film and digital camera equipment, including scanners and printers. You'll also find a nice selection of tips and hints for beginning photographers.

shopnow.com

Corporate Headquarters Network Commerce Inc.
411 First Avenue South
Suite 200 N
Seattle, WA 98104

206-223-1996
Fax: 206-223-2324

www.shopnow.com

This online service helps consumers find and compare the lowest prices online. According to the site, prices are updated daily. You'll also find ratings by consumers of the various sources that sell products online, so you can also choose according to the reliability and service of the vendor. You can also check consumer ratings of the online stores before you buy.

Steve's Digicam

www.steves-digicams.com

This site has gained quite a reputation for being a really great resource for information and reviews on anything digital in photography. It covers just about everything you can imagine. This is a good one for your bookmark list.

Z Reiss & Associates, Inc.

800-943-2000

www.zreiss.com

Z Reiss, a film retailer, has an interesting new product called The Wallet. It is a CompactFlash card with a full-color pocketsize screen for presenting digital images right out of the camera or downloaded from your computer.

Software

All of the companies in this section make software that's related to digital photography, much of which serves a specific purpose. Several of these companies also make Photoshop-compatible plug-ins to expand the capabilities of Photoshop and Photoshop Elements.

Adobe Systems, Inc.

345 Park Avenue
San Jose, CA 95110-2704

408-536-6000

www.adobe.com

Adobe is a leading manufacturer of design and graphics software and makes Photoshop, the king of photo-editing software. The site is valuable as a resource for breaking news, for downloading Adobe Acrobat Reader so that you can read the many online documents and lessons given in that format, and for some of the industry's best professional graphics tips. Adobe manufactures the following software related to digital photography: Photoshop 5.5, Photoshop Limited Edition, PhotoDeluxe Business Edition and Home Edition, and Press Ready (which can turn your inkjet printer into a proofing tool for prepress work). The Adobe site is also an excellent resource for finding third-party Photoshop-compatible plug-ins. Many valuable Photoshop tips and tricks also appear on the company's site.

Altamira Group

818-556-6099

www.atlimira-group.com

Altamira Group is now part of Lizardtech. Genuine Fractals compression software can create a virtually lossless compressed file much smaller than the original file. It can also create files much larger than the original without losing the sharpness of edges. This is an especially worthwhile product for making poster-size images from publication-quality photos.

Arcsoft, Inc.

46601 Fremont Blvd.
Fremont, CA 94538U.S.A.

510-440-1270

www.arcsoft.com
support@arcsoft.com

Many of this company's software applications are designed for image editing and Web production. The products include PhotoStudio, PhotoPrinter Pro (multi-image printouts), Photo Fantasy, Photo Montage, Panorama Maker, and Photo Impression.

Aztek, Inc.

23 Spectrum Pointe #209
Lake Forest, CA 92630

800-GRAPH-55
800-472-7455

www.aztek.com

Aztek is an industry supplier and consultant of digital software and hardware systems. Aztek claims to have sold more than 300 digital major production facilities/systems to a variety of Fortune 500 companies.

Corel Corporation

1600 Carling Avenue
Ottawa, Ontario, Canada

www.corel.com
custserv@corel.com.

Corel is one of the leading software companies in the areas of imaging and graphics. They have a very impressive lineup of applications to handle vector illustration, layout, bitmap creation, image editing, painting, and animation. Some of the applications Corel offers include:

✦ Corel Draw10 and Corel Photo-Paint 10 for image editing and creation. These are Corel's most well-known products.

✦ Ventura 8 and WordPerfect 2002 for publishing.

✦ Bryce 5 for power 3-D landscape and animation application.

✦ KPT tools suite Photoshop-compatible plug-ins for special effects.

Procreate, a new division of Corel, is distributing its newly acquired Painter 7 (the best known paint program) and Knockout, a powerful utility for image extraction.

Deneba Software

7400 SW 87 Avenue
Miami, FL 33173

www.deneba.com

Deneba manufactures Canvas 7, a program that does both vector illustration and bitmapped image editing. The program has matured to a high level of sophistication. It is available for both Mac and Windows. The latest features in the program enable it to run photographic plug-in effects on both vector illustration and photos, and these can be combined into a single image.

Font Shop

74 Tehama Street
San Francisco, CA 94105

888-FF-FONTS
888-333-6687
415-512-2093

www.fontshop.com

You can find thousands of different fonts on this site.

Graphx, Inc.

400 West Cummings Park
Woburn, MA 01801

781-932-0430

www.graphx.com

Graphx, Inc. designs computer software products to enhance the performance of color printers and film recorders. RasterPlus is software designed to meet the needs of a wide range of clients, such as service bureaus, corporate imaging centers, desktop presenters, and the professional photo retouching industry. Some of its other products are designed to ease production flow, including WinSlide/MacFilm and PackagePlus.

Informal Software

2060 Walsh Avenue, Suite 192
Santa Clara, CA 95050

408-845-9490

www.informal.com

Informal makes Enotate software, which enables you to use a PDA as a direct PC input/output device alongside the traditional keyboard, mouse, and monitor. Unlike pen tablets, drawing/sketching software packages, or other pen-based computing solutions, Informal Software's unique "Informal Interface" enables PDAs to interact naturally with a personal computer in a manner analogous to the comfortable "pen and paper" model. Enotate enables traditional pen-and-paper tasks to be completed digitally, including freehand sketching and real-time annotation of existing files, such as digital photographs.

Internet Pictures Corporation

1009 Commerce Park Drive
Oak Ridge, TN 37830

888-425-0098
865-482-3000

www.ipix.com

Internet Pictures Corporation makes iPIX Panorama software, which works with a fish-eye lens and makes the entire 360-degree panorama in two shots. For the tripod rotator and software, the cost is $149.95; if you add the fish-eye lens, then the cost is $349.95. Quality is only good enough for the Web. $69 + 6.99 for each processed photo.

IXLA USA, Inc.

126 Bonifacio Place
Monterey, CA 93940

203-730-8805

www.ixla.com

IXLA manufactures easy-to-use imaging software specifically for digital cameras. Some of the software packages it offers are: Web Easy, Explorer, Photo Easy, Media Easy, and Preferred Web Hosting. Most are under $50. For a mere $29.95, IXLA also makes very powerful cataloging software that lets you batch-process image files, convert file formats, e-mail photos, and create picture Web pages.

Lemke Software

Erich-Heckel-Ring 8a
31228 Peine
Germany

support@graphicconverter.net
www.lemkesoft.de/us.gcabout.html

Lemke produces a very powerful graphics file conversion tool that has just about every graphics file format known. It's called the Graphic Converter 4.0 Mac OS X, and it costs $35. Graphic Converter is also a very competent image-editing program and a good choice for Mac users who aren't ready to invest in a more professional program such as Photoshop.

Mediafour Productions

1854 Fuller Road, Suite 1
West Des Moines, IA 50265-5526

515-225-7409

www.mediafour.com

Mediafour makes software for Windows that enables you to open and read the content on Macintosh formatted disks. The program works on virtually all types of disk drives, including removable media. The software costs less than $60 and can be downloaded online.

MGI Software

www.mgisoft.com

This company's focus is on imaging software for the mass market and for e-commerce Web sites. Most of its products are for Windows only. MGI recently purchased LivePicture, Inc., and sells the program for $149.95 on clearance. It once sold for several thousand dollars. If you're into compositing images for high-end use, this is the product to have. However, the company seems to have no plans to continue the program's publication into newer versions. Most of MGI's applications are priced at under $100 and are intended for a novice audience—though some have quite powerful features. Products include Video Wave video editing, PhotoSuite image editing and Internet optimization, Digital Makeover Magic for checking out how you'd look in different hairstyles and clothing, Live Picture PhotoVista for 360-degree image panoramas, and Looney Tunes Photo Fun for helping kids to build party favors, greeting cards, and so forth.

Microsoft Corporation

One Microsoft Way
Redmond, WA 98052-6399

425-882-8080

www.microsoft.com

Now here's a company that needs little introduction. It may surprise you, however, to discover that it publishes two image-editing programs that are especially useful for "quick and dirty" manipulations in making digital photographs look professional: PhotoDraw 2000 and Picture It! 2000. PhotoDraw 2000 is now in version 2.0 and features tools for optimizing Web graphics and for creating animated GIFs,

image maps, and rollover events. Image editing includes such quick fixes as dust and scratch removal, one-click color balancing, and over 20,000 clip-art stock images. The program also includes templates for designing various types of documents. In addition to bitmap image editing, you can incorporate vector drawings (there's a healthy set of drawing tools) and do some natural media painting. Picture It! is aimed at beginning and occasional users of digital cameras and is similar in functionality to Adobe PhotoDeluxe or other under-$100 digital camera editing software. Functions in this program also make it especially attractive to a wider range of users, including professionals. One of these is the ability to apply certain manipulations to make corrections to multiple images at the same time: crop, rotate, correct brightness, contrast, and tint. The program also includes image thumbnail cataloging. Picture It! sells for under $55.

PanaVue

616 boul. Rene-Levesque Quest
Quebec G1S 1S8
Canada

+418-688-4720

www.panavue.com

PanaVue offers software for the digital stitching or assembling of two or more images into a panorama. Its software is for Windows only.

Right Hemisphere

2740 West Magnolia Blvd, Suite 305
Burbank, CA 91505

877-309-3204

www.us.righthemisphere.com
info@righthemisphere.com

Right Hemisphere sells a Photoshop plug-in called Deep Paint ($249.00), which provides very advanced paint capabilities similar to Corel Painter. It is definitely worth a look to see what this power program can do. Right Hemisphere also makes a number of other products that are aimed at 3-D modeling and rendering.

SeeAllAround.com

www.seeallaround.comservices.htm

This Web site offers a 360-degree virtual tour photography for the Web as well as a service that enables people with digital cameras to create their own affordable panoramas. The site is featuring a software product called Stitchpress. Check out the demos and galleries.

Ulead Software

Ulead Systems
20000 Mariner Ave
Suite #200
Torrance, CA 90503

310-896-6388
Fax: 310-896-6389

www.ulead.com
www.ulead.comlearning/photography.htm

Ulead is a leading software developer for digital imaging. It makes an impressive suite of applications that function as development, editing, and utility tools. You will also find a collection of informative articles that will help you understand how digital photography works and make you become a better digital photographer.

Vivid Details

8228 Sulphur Mtn. Rd.
Ojai, CA 93023

805-646-0217

sales@vividdetails.com
www.vividdetails.com

Test Strip 3.0 is a Photoshop plug-in for producing print tests.

VR Toolbox

P.O. Box 111419
Pittsburgh, PA 15238

877-878-6657
412-767-4947

www.vrtoolbox.com

VR Worx is cross-platform (Mac and Windows) QuickTime VR software that will do object, scene, and panoramic stitching. Programs for objects, scenes, and panoramas are available individually as well, or you can buy the whole thing for $299, a savings of about $90. VR Worx works as a Photoshop plug-in. You can download a free demo version from the company's site. VR Worx differs from Apple's software in that it has more features and is cross-platform.

✦   ✦   ✦

Your one-stop resource for serious digital photography . . .

In the last few years, digital photography has gone mainstream, with today's best "prosumer" cameras rivaling the performance of traditional 35mm SLRs. Now updated to cover the latest cameras, accessories, and software and revised throughout with dozens of hands-on tips for location shooting and the digital darkroom, this one-of-a-kind guide demonstrates the step-by-step procedures for achieving picture-perfect digital results, whether you're a professional photographer, a serious amateur, or a graphic artist.
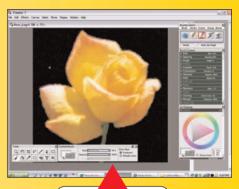
Inside, you'll find complete coverage of digital photography

- Understand pixels, bit-depth, resolution, and other digital photo basics

- Make sense of the latest features and get the best digital camera and accessories for your needs

- Get tips on shooting memorable images, from lighting to location to composition

- Discover the secrets of great digital photo shoots, from sports and nature to portraits and macros

- Outfit a PC for image-processing and acquire a quality scanner and printer

- Master image-editing basics in Photoshop or Photoshop Elements

- Push the limits with advanced techniques and special effects using Photoshop, software filters, and Painter

- Get the scoop on preparing and enhancing images for the Web

- Discover the secrets to printing great digital images

Get creative with your digital images

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Shelving Category:
Photography/Computer Graphics

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